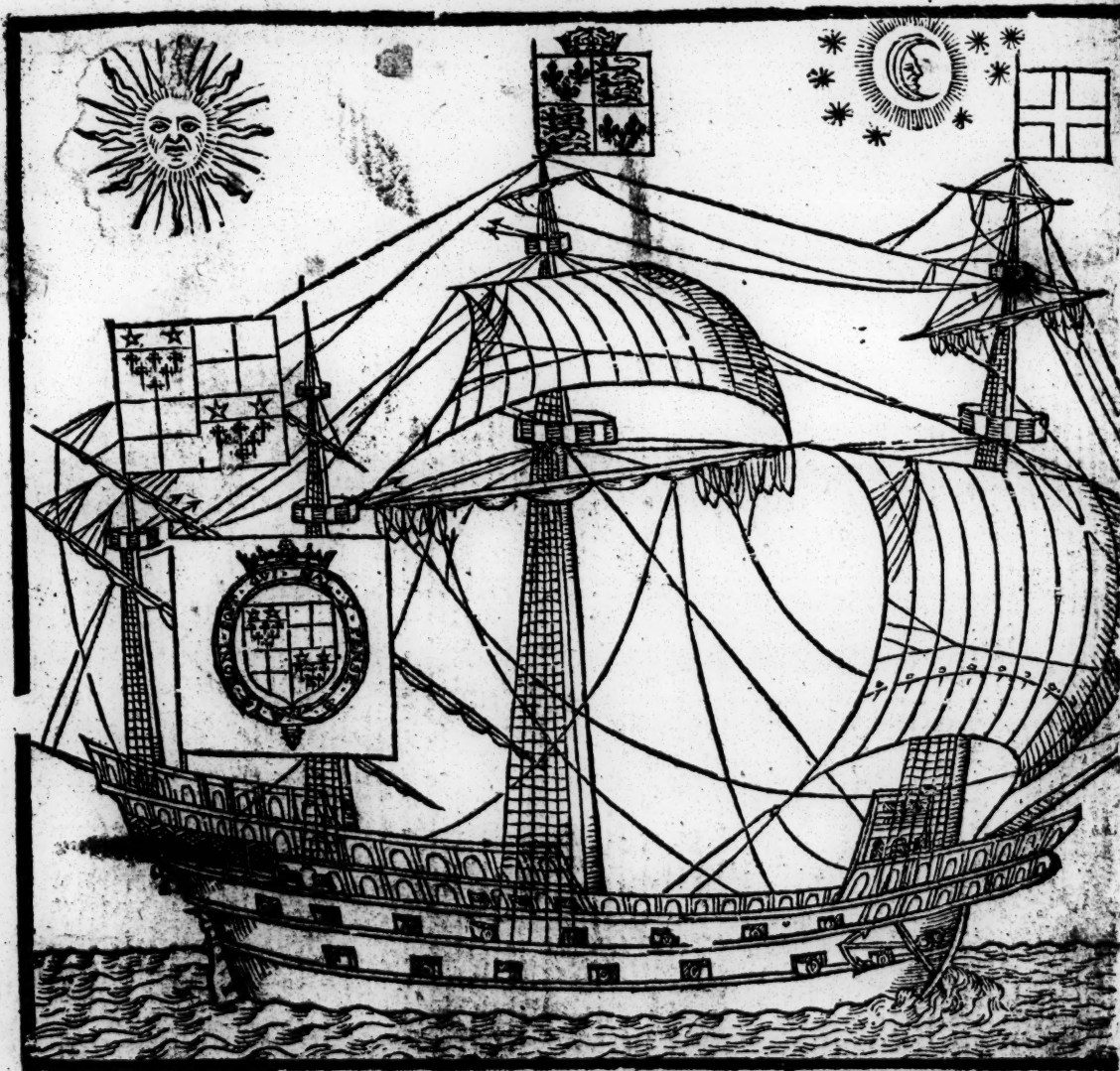


A REGIMENT FOR THE

• SEA, CONTAINING VERY NECESSARY MAT-
ters for all sorts of Sea-men and Trauailers, as Masters
of Ships, Pilots, Mariners, and Marchants.

NEWLY CORRECTED AND
amended dy the Author.

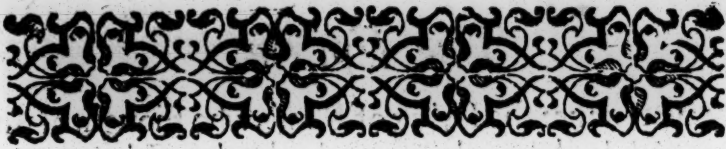
Wherevnto is added a Hyd:ographickall discourse
to goe vnto Cattay, fve feuerall wayes.
written by William Bourne.



IMPRINTED AT LONDON BY T. ESTE
for Iohn Wight.

1504

Naw



TO THE RIGHT HO-
nourable, Edward Earle of Lin-

colne, Baron of Clinton and Say, Knight of the Noble
Order of the Garter, Lord high Admirall of England,
Ireland, and Wales, and of the Dominions and Iles
thereof, of the Towne of Calice and Marches of
the same, Normandie, Gascoyne, and Guyone,
and Captaine generall of the Queenes

Maiesties Seas and Nauie Royall,

William Bourne vvisheth in-
crease of Honor, in per-
fect health.



RIGHT Honourable, and my singular
good Lord and Master, when I had often
repeated and called to my remembrance
the opinion and sayings of the sage and
auncient Writers, that one man should be
an Instrueter vnto an other, by seeking &
paines taking to doo them good: so at sundrie times haue
I studied and deuised with my selfe, what thing to take in
hand that might most profit my friendes and my natiue
Countrey: and at the length it came vnto my remem-
brance how necessarie a thing it was for Sea-faring men
to haue some good instructions: wherevpon I haue writ-
ten this base and simple Regiment for the Sea, & Rules
of Nauigation, for that I knowe it to bee so needefull and
necessarie for all sorts of Sea-men.

Therefore at fundrie times as I haue had leasure, I haue
compiled and written this base and simple worke, calling

¶ A.ii.

to

The Epistle.

to remembrance the saying of Plinie, who thought al time lost, which he did not bestow at his booke: I, being of all other most simple, yet notwithstanding this enterprise haue I taken in hand, to publish this simple booke vnto all men.

And for that all my labours be due vnto your Honorable Lordship, according to my bounden dutie I preferre it vnto your Honour, hoping that your Lordshippe will vouchsafe to take it in good part, and to receiue this barbarous worke, more to take it as my good will, (which is to offer things of much more excellencie) than the finesse of the worke, for that it is but simple. And so shall I not onely be satisfied, but also further encouraged heereafter to trauel, according to the simple gift and talent that God hath giuen vnto me: For that it is not altogether gathered out of other bookes, but that the greatest parte is deuised and practised by mee. Therefore I trust my labors (such as they be) shall not hinder the cunning & learned sort, but further the late beginners, that are as yet not well instructed. And thus I cease to trouble your honorable Lordship any longer, desiring you to take this simple thing in good part, as a true token and signe of my good will, beseeching God of his grace to prosper your Lordship in honour and vertue with perfect health. Amen.

By your Honors poore seruant,

William Bourne.

The Preface to the Reader.



IN my opinion (gentle Reader) which also is the saying and writing of all the Philosophers, those things are most principally to be taught and maintained, which in the common wealth are most profitable and necessarie. Then maye I boldly say (without iust cause of reproofe) and affirme, that Nauigation is not the least, but one of the principall matters to be knowen, as this time doth require. Considering the state and scituation of our Countrey, for that we be inuironed round about with the Sea, so that we neither can goe out of our countrey, neither they that are of other Countries can come at vs, but onely by Sea. These things (I say) considered, what can there be more necessarie to be taught in our common weale, than Nauigation, considering also what Nauigation is: as Nauigation is how to direct their course vppon or thorow the Sea, where he findeth no path to any place assigned, and how to attaine the port or place appointed in shortest time, how also to preferue the ship and goods in all common disturbance, as stormes, daungers by the waie, and such other lyke, &c. Moreouer and besides that, it is not vnknown how necessarie Nauigation is, both for the transportation of our commodities, to finde vent for them in other countries (wherby no small number of people is set a worke in England) and also the bringing of other commodities (that we haue need of) vnto vs, by which meanes the Queenes Maiestie receiueth no smal benefit for this her customes, &c. And furthermore, for that Nauigation is the chiefe force and strength of our countrey, which whether it be true, I referre to the iudgement of all men, and although I be but simple (gentle Reader) and a great number of excellent learned men in the Mathematical science, haue written diuers bookes of Cosmographie and Nauigation, yet notwithstanding I haue written this regiment for the Sea,

The Preface

with a few rules of Navigation, as it wer a Nosegaie, whose
flowres are of mine own gathering. And albeit the learned
sort of Seafaring men haue no need of this booke, yet am I
assured that it is a necessarie booke for the simplest sort of
Seafaring men: For that they shall finde heere the names
of the circles in the Sphere, with the names of diuers things
meete for Navigation, together with their vses, which the
most part of Sea men doo mistake or misse-cal, neither do
they know the vse of them, beeing yet most necessarie for
them that vse Navigation. In which also there is a Table
of Declination calculated for foure yeeres (that is to say, for
the yeere of our Lord 1577. the first after Bissextilis, the
yeare 1578. being the second yeere, & the yere 1579. which
is the third yeere, with the yeare 1580. which is the yere of
Bissextilis, or Leape yeere it selfe) which the Sea men doo
call a Regiment, and will serue for 24. yeeres, without any
great error, & is exactly calculated for the longitude of Lō-
don, for the instant time of noone, and wil serue all Europe
and Affrica, nere vnto the coast of America, without much
errour, sauing in Februarie, March, or September, whilst
the Sun hath swift declination. But in Iune & December,
it wil serue all the worlde ouer: because the Sunne hath but
slow declinatton, &c. And also there bee other necessarie
Rules of Navigation, to knowe how to handle the Sunnes
declination, to know the altitude of either of the two Poles,
(as the contents of the booke do shew) with other necessa-
rie things meete to be knowen in Navigation, & not men-
tioned in the booke of Martine Curtise, called The Art of
Navigation. Neither do I meane to write any thing menti-
oned in that booke, for that it is there sufficiently declared
alreadie. And thus) gentle Readers.) I desire you to beare
with my rudenesse, that I should take vpon mee to open a-
ny Science, for that I am vtterly vnlearned, & without help
of any learned persons, desiring you not to conceiue anye
cuill opinion of me, but to take it as my good will, minding
to

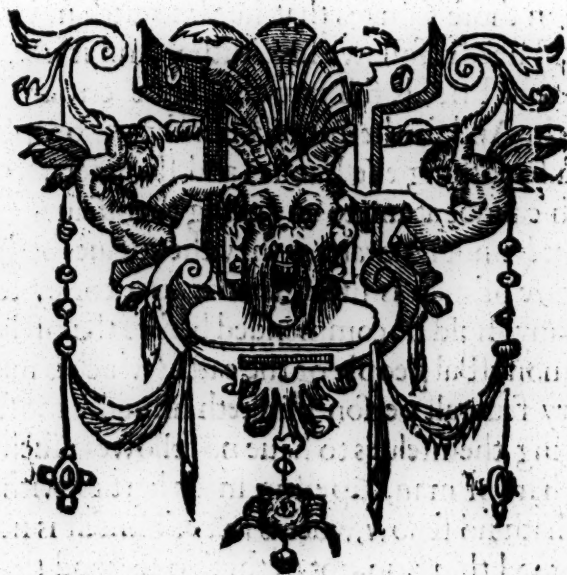
To the Reader.

to profit my native Countrie, as much as lieth in me. Notwithstanding it is possible that some people will be offended with me, that I should write this simple Treatise, but then I consider againe and know, that Vertue lacketh no enemies and defacers, and Vice lacketh no friends & maintainers, so that knowledge lacketh no contempt, neither ignorance lacketh furtherance, & especially among al people there is none more readie to contempne then the ignoraunt sort: for ignorance is the father of all errors, and the mother of contention.

And thus I drawe to ende, desiring you to take this simple worke in good part, beeing willing to pleasure my native Countrie, according to the simple Talent that God hath giuen me. And whereas you finde any error, I praie you let me gently vnderstand, for I thinke not that I can so circumspectly work, but I may be deceiued, for man cannot be so precise but he may erre, and I haue seldome heard of any the best Authors but he hath erred in some point: Therefore in those things that hee knoweth not of himselfe, he must needs followe his Author, and if his Author doe erre, he must needs fall into the same error that his Author doth. And furthermore, a number of people there be that deuise nothing else but lies and slaunders, yea, and those which cannot attain to any thing themselves, do hate all those that be not ignorant as they themselves be: For the corrupt nature of man is such, that it is a curse to their hearts, that any shuld be commended before themselves, for generally amongst al people of the earth (which is innumerable,) euery seuerall person thinketh himselfe most worthy, imagining themselves to haue no fellowes: such is the diuel in the hart of man, pappering mans hart so with pride to think he hath no fellow, whereas man of himself is not able to doo any good thing, no, not to think one good thought,
but

To the Reader.

but by the onely might and providence of almightie God, therefore of our selues we can do nothing that is good. And thus gentle Reader, I make an end. If this simple and barbarous thing be taken in good part, then looke for other of my workes shortly, and beare him good will that studieth for the benefit of his native countrie, desiring God of his grace, that I and you may doo the thing that may be to the laud, praise, and glorie of God, to our commoditie & soules health, to the profit of our brethren, & the common wealth of this our Realme. Thus I betake you to almightie God, the creatour of all things, praying him that both I and you may after this lyfe rest in the kingdom of Heauen, with Abraham, Isaac, and Jacob: there to remaine world without ende,
Amen.



To the reader.



Entle Reader, I haue thought it good now
in this Impression to mende or correct
certaine faults that were in the first, but
most specially in the seconde Impression:
For that it was printed the second time,
I not knowing thereof, so that it had not
onely those faults that were printed out of y first writ-
ten coppie, but a great number of new faults more than
that it had in the first. Wherefore I haue not onely mē-
ded and corrected those faults, but in like manner I haue
added other necessarie matters, not before this time prin-
ted, as this. What Eccentrix is, and also what Paraler
is, and his vse, as it doth appeare in the 6. folio of the
booke. And also I haue in like manner shewed how that
Sea-men shall knowe when that the Moone is in her
slow and swift motion, which is knowen by the Prime,
as it is declared in the third Chapter. And also how for
to know the Moones latitude as it is shewed in the 4.
Chapter. And also I doe show in the 5. chapter, the cause
that there is more daies from the Equinotiall of March
vnto the Equinotiall of September, then there is from
the Equinotiall of September vnto the Equinotial of
March. And also I haue added vnto the 11. Chapter cer-
taine matters as touching discoueries vnto the North
parts. And furthermore, I haue shewed in the 14. chap-
ter, how for to know how fast or softly that any ship do-
eth goe, & how for to keepe a perfect account of the ships
waye. And also I haue altered cleane the xvii. Chap-
ter, & shewed how that the Sea-men shall knowe what
part or quantitie that they haue passed or gone of the
whole earth, wherby y they shal know the diuersitie of
aspects as the Eclipses of the Moone, & the alteration of
time, & also I haue added diuers things in sundry places.

To the Reader.

of the Booke, that I doe omit for breuitie. And in lyke manner I haue added vnto the ende of the booke, a Hydrographicall discourse for to goe vnto Cattay, & severall other sundry wayes, that is to say, the first waye is about by Cape bone sperance, which is that waie that the Portugalls dooth goe vnto Calicut, and vnto the Moluccas, & other places in the East Indies: the seconde waye is thorough the straights of Magalenos, into the South sea: the third waye is towarde the North-west, whereas Captaine Forbisher and Christopher Hall, hath begunne the discoverie now called Meta Incognita: and the fourth way is by the North-east by the coast of Noua Zembla, that Master Stephen of Borrose hath begun that discoverie. And the fifth way is by the North Pole, if that it be nauigable, &c.

Now it is possible that I maye be enuied of diuers and sundry people, for that I haue written this discourse of the Passages vnto Cattay, for that the nature of a number of men is to dislike of all things not done by themselves: But notwithstanding all is one vnto me whether they doe like or dislike. For that I doe knowe some persons hath alreadye made euill report of that I haue written before this time, yet notwithstanding I will not stay my pen for their mallice: for although their I killes is much more than mine, my meaning is not to teach any of them, but to instruct the simplest sort of sea men, for to shew vnto them such things as is necessarie for them for to know. And also some sort of people are of that nature, if that they write or talk of any things past their capacitie, then they will say y he can talk well, but they themselves can not talke but they can doe, but this is the truth, whatsoeuer he be that will saye that hee can doe anye thing, and if that he cannot shew the reason of the doing thereof I doe saye vnto you he can not doe

To the Reader.

do it, & this is most certayne, for if that hee doth it, hee doth it but by Fortune, euen as he that drew his bow by chaunce in the Assyrians host, and selwe Achab the King of Israel, as we do read in the thirde booke of the Kings and the last chapter, when that Iosaphat the king of Iuda, & Achab king of Israel, went to battaile against Ramoth in Gilead.

For this is generall amongst Sea-men and also Gunners, how simple or without skill soeuer that they be, if that they haue once taken charge to be the Master of a shippe, he thinketh great scozne to learne at any mans hande, but will bragge of himselfe how long he hath ben a Master, and God knoweth vtterly without skill, but that he is a coaster, and doth know the marks for to carrie a shippe ouer the landes ende, and ouer the Paase.

But good simple men, if that they coulde not doe that, then there were nothinge in them: For euery man must needes be skilfull and knowe that place that a number of times he hath occupied, and hath ben taught vnto him.

And who doubteth but a simple Fisher-man of Barking, knoweth Barking Creeke, better than the best Nauigator or Master in this lande: so who doubteth, but these simple men doth know their owne places at home. But if they should come out of the Decean Sea to seeke our Channell, to come vnto the Riuer of Thames, I am of that opinion, that a number of them doth but grope as a blinde man doth, and if that they do hit well, that it is but by chaunce, and not by any cunning that is in him.

But I do hope that in these dayes, that the knowledge of the Masters of shippes is verie well mended,

To the reader.

fo; I haue knowen within this 20. yeres that them that were auncient masters of ships hath derided and mocked them that haue occupied their cardes and plats, and also the obseruation of the altitude of the Pole, saying: that they care not fo; their sheepes skinnes, fo; he coulde keepe a better account vpon a boord.

And when that they did take the latitude, they wold call them starre shooters and Sunne shooters, and wold as ke if they had striken it. Wherefore now iudge of their skills, considering that these two poynts is y principall matters in Nauigation. And yet these simple people wil make no smal brags of themselves, saying: that he hath ben master this 20. yeres, and neuer had no misfortune, and also if that they could heare of any, that did vse Plats and instruments that had any misfortune, then they wold not a little brag of themselves, what notable fellows they themselves were.

What a notable folly was in these men, not considering what they themselves were. For this is most certaine, that it is not wisdom nor cunning, that can present nor alter Gods prouidence, if that it please him to lay his scourge vpon vs. For if that men through cunning could prouide that no misfortune shuld happen vnto them, then were they Gods and not men, and yet notwithstanding we must not condemne cunning & knowledge but put all things vpon Fortune, then you maye take one from the Plough, and make him master of a ship, & say he hath good Fortune. And thus (gentle Reader) I cease, requesting thee to accept this as a simple present proceeding of god will.

Thine W.B.

The regiment for the Sea.

For that the common people doe fall into such a number of errors as touching the length of the daie, holding an opinion, that in euerie fiftene dayes, the daie is an houre longer or shorter, the truth is this: the day doth keep no such proportion in the lengthning and shortning, but doth length and short according vnto the swiftnesse and slownesse of the Sunnes declination: for when the Sunne hath swift declination, then doth the daie lengthen and shorten a pace: and when that the declination is slowe, then both the daie lengthen or shorten but slowly. And yet the most parte of the common people doe hold an opinion, that at Christmasse or else at fewe yeares daie at the furthest, the day must needs be an houre longer, and yet the Sunne hath not declyned or come towards the Equinotiall two degrées and a halfe, which will not make halfe an houre in the length of the daie: wherefore I do thinke it good to declare throughty y whole yere, when the daie is an houre longer or shorter here in this place, for the latitude or height of the Pole Articke at London, the Pole being raised fiftie one degrées, thirtie two minutes, or thirtie foure minutes: and our longest Summer daie is sixtene houres and a halfe, & our shortest Winter daie is seauen houres and a halfe, from the rising of the Sunne vnto the setting of the Sunne: and first this: the shortest Winter daie, is the 11. or 12. day of December, and then the Sunne riseth a quarter of an houre after eight, and setteth a quarter of an houre before foure of the clocke, and then the Sunne hath his greatest declination vnto the Southwardes. And then the 29. daie of December, the daie is a quarter of an houre longer, then riseth the Sunne at eight of the clocke, and sets at foure. And then the 17. or 18. of Januarie the daie is an houre longer and not before, for the Sunne must be declined from his Solsticke of Winter, thus degrées and twelue minutes, before the daie is lengthened

The regiment for the Sea.

ned an houre, so that I doe affirme, that from the fourth
or 5. day of Nouember, vnto the 17. or 18. daie of Ianua-
rie in all that time the daie is but one houre shorter and
longer, which is the time of ten weekes. And then the
27. or 28. of Ianuarie the night is fiftene houres long,
then riseth the Sunne halfe an houre after seauen, and
setteth halfe an houre after foure of the clocke. And then
the leauenth or twelfth daie of Februarie the day is ten
houres long, then riseth the Sunne at seauen, and set-
teth at fise of the clocke. And then the fise and twentie
daie of Februarie the daye is a leauen houres long, then
riseth the Sun halfe an houre after fise, and setteth halfe
an houre after fise of the clocke. And then the leuenth day
of March, then the Sun is vpon the Equinoctial, & the day
iust 12. houres long all the world ouer. And then y^e 24. day
of March, the day is 13. houres long, and then riseth the
Sun halfe an houre before fise, and setteth halfe an houre
after fise of the clocke. And then the seauenth daye of A-
prill the daie is fourteene houres long, and then riseth
the Sunne at fise of the clocke iust, and setteth at seauen
of the clocke iust. And then the 23. daye of Aprill the
daie is fiftene houres long, and there riseth the Sunne
halfe an houre before fise, and setteth halfe an houre af-
ter seauen of the clocke. And then the 15. day of May the
daie is sixteene houres long, then riseth the Sunne at
foure of the clocke, and setteth at 8. of the clocke iust. And
then the leuenth of Iune the Sunne hath his geratest
declination to the Northwarde, and then is our longest
Summer dayes, and then it is sixteene houres and a
halfe, from the Sunne rising vnto the Sunne setting, so
that the Sunne riseth a quarter of an houre before foure,
and setteth a quarter of an houre after 8 of the clocke.
And then the tenth day of Iuly the day is sixteene houres
long, then riseth the Sunne at foure, and setteth at eight
of the clocke. And then the last daie of Iuly, the day is six-
tene

The Regiment for the Sea.

teene houres long. And then the firtene day of August the day is foureteene houres long. And the the last day of August the day is thirtene houres long. And then the thirtene or foureteene of September the Sunne is vpon the Equinotiall & the daie iust twelue houres long. And the the 27. daie of September the daie is eleuen houres long. And then the 11. day of October & daie is ten houres long. And then the 26. day of October the daie is nine houres long. And then the fiftene day of Nouember the day is 8. houres long, and so vnto the leauenth or twelfth daye of December, and then the daie is at the shortest (as before is declared.

Thus much haue I sayd, as touching the length of the day by euen houres, which some people will haue at the enterance of the Sunne into the twelue signes, of which in the lengthning and shortning of the daie there is no such matter, but onely this: Loke when that the Sunne hath declined five Cegrees and twelue minutes in this our latitude, then is the daie an houre longer or shorter, as you shall finde this matter more largelier spoken of in all places throug the world, in the leauenth Chapter of the Booke.

A



A Table of the reigne of Kings since the Conquest.

Number of Kings and Queenes.	The names of the kings of England.	Beginning of their Reigne.	Time of their death.	The place of their buriall.
1	Willia Conqueroz	14. Oct.	9. Sept. 1087	Cane in Poz
2	William Rufus.	9. Sept.	1. Aug. 1100	Westminst.
3	Henrie the first.	1. Aug.	2. Decr. 1136.	Reding.
4	Stephan.	2. Decr.	25. Oct. 1154.	Heuerham.
5	Henrie the second.	25. Oct.	6. July. 1189.	Fonteueraud
6	Richard the first.	6. July	6. April. 1199.	Fonteueraud
7	John.	6. April	19. Oct. 1216	Worcester.
8	Henrie the third.	19. Oct.	16. Nov. 1272	Westminst.
9	Edward the first.	16. No.	6. July. 1307.	Westminst.
10	Edward the second	6. July.	25. Jan. 1327.	Glocester.
11	Edward the third.	25. Jan.	21. June. 1377	Westminst.
12	Richard the second	21. June	16. Sep. 1400	Westminst.
13	Henrie the fourth.	16. Sep	20. Mar. 1413	Canterburie
14	Henrie the fifth.	20. Ma.	31. Aug. 1422.	Westminst.
15	Henrie the sixt.	31. Aug	4. Mar. 1461.	Winsoze.
16	Edward the fourth	4. Mar.	9. Aprill. 1483	Winsoze.
17	Edward the fifth.	9. April	22. Jun. 1484	Westminst.
18	Richard the third.	22. Jun	22. Aug. 1486	Leycester.
19	Henrie the seventh	22. Aug.	22. Apr. 1509	Westminst.
20	Henrie the eight.	22. Apr.	28. Jan. 1547.	Winsoze.
21	Edward the sixt.	28. Jan.	6. July. 1553.	Westminst.
22	Quene Mary.	6. July.	17. Nov. 1559.	Westminst.
23	Quene Elizabeth.	17. No.		

The

The Kalender.

Januarie hath xxxij. dayes.

3	1	a	New yeares day.
	2	b	Octa. Stepha.
11	3	c	Octa. John.
	4	d	Octa. Inno.
19	5	e	Theodosio bi.
8	6	f	Twelfth day.
	7	g	Julian Mart.
16	8	a	Severine Bish.
5	9	b	Partian Virg.
	10	c	Paule first her.
13	11	d	Sunne in Aquari.
2	12	e	Satire Mar.
	13	f	Oct. Epipha.
10	14	g	Theodoze Mart.
	15	a	Maurice.
18	16	b	Anthonie Abbot.
7	17	c	Marcelle Bish.
	18	d	Prisce Bish.
15	19	e	Mari and his fel.
4	20	f	Fabian and Sa.
	21	g	Agnus Virg.
12	22	a	Vincent Mar.
1	23	b	Emerice.
	24	c	Timothie discip.
9	25	d	Con. of Paul.
	26	e	Policarp. Mart.
17	27	f	Chrylost. Doct.
6	28	g	Theodoze.
	29	a	Valerie Bish.
14	30	b	Tran. S. Marke.
3	31	c	Ciri. and Jan.

Februarie hath xxviii. dayes.
and in the yere of Bissex-
tilis xxix. dayes.

	1	d	Brigit. Fast.
11	2	e	Puri. of Marie.
19	3	f	Blase Mart.
8	4	g	Gilbert Confess.
	5	a	Agathe virg.
16	6	b	Dortheie virgin.
5	7	c	Amandus Bish.
	8	d	Salamon.
13	9	e	Sunne in Pisces.
2	10	f	Sother Bishop.
	11	g	
10	12	a	Eufraze virgin.
	13	b	Valentine Bish.
18	14	c	Faustine Bish.
7	15	d	Julian Virg.
	16	e	Constance Virgin.
15	17	f	Simeon Martir.
4	18	g	Cabine Priest.
	19	a	
12	20	b	60. Martirs.
1	21	c	70. Martirs.
	22	d	Peters Chayre.
9	23	e	Sirener. Fast.
	24	f	Mathie Apostle.
17	25	g	Policar. Bishop.
6	26	a	Victor and his fel.
	27	b	Augustine Bishop.
14	28	c	Oswale Bishop.

¶

March

The Kalender.

March hath xxxi. dayes.

3	1	d	David Bishop.
	2	e	Basilic Part.
11	3	f	Marine Part.
	4	g	Lucius Part.
19	5	a	Focius Part.
8	6	b	Wic. and Wenin.
	7	c	Tho. de Aquin.
16	8	d	Apoline Part.
5	9	e	40. Martirs.
	10	f	Gregorie bishop.
13	11	g	Sunne in Aries.
2	12	a	Zacharie bishop.
	13	b	Longine Part.
10	14	c	Patricius bishop
	15	d	Gertrude virgin.
18	16	e	Anselme.
7	17	f	Edward King.
	18	g	Joseph spons.
15	19	a	Cutbert bishop.
4	20	b	Benedict Abbot.
	21	c	Affrodose bishop.
12	22	d	Pigment. bishop.
1	23	e	Theodoze.
	24	f	Falt.
9	25	g	Annun. of Mary.
	26	a	Calfoze Partz.
17	27	b	John Heremy.
6	28	c	Dozothe Partz.
	29	d	Eustace.
14	30	e	Sabine Virgine.
3	31	f	Walbine Virgin.

Aprill hath xxx. dayes.

	1	g	Theodoze virgin
11	2	a	Mary Egyptian.
19	3	b	Richard Bishop.
8	4	c	Ambrose bishop.
	5	d	Marci. and Pa.
16	6	e	Sertus Part.
5	7	f	Euphemi. Virgin
	8	g	Denise mart.
13	9	a	Perpetuus Wils.
2	10	b	Parcus mart.
	11	c	Sunne in Taurus.
10	12	d	Appoline Partz.
	13	e	Sother mart.
18	14	f	Tiburt Part.
7	15	g	Almond bishop.
	16	a	Isidore Bishop.
15	17	b	Anicete Bishop.
4	18	c	Cluther Bishop.
	19	d	Tiburtius Conf.
12	20	e	Hermogenes.
1	21	f	Quintine.
	22	g	Clete bishop.
9	23	a	George mart.
	24	b	Wilfride Conf.
17	25	c	Marke Euange.
6	26	d	Anastace bishop.
	27	e	Vitalis Part.
14	28	f	Peter of Pi.
3	29	g	Clete Bishop.
	30	a	Dep. of Erken.

May

The Kalender.

May hath xxxj. dayes.

11	1	b	Philip and Iacob.
	2	t	Athanasius bish.
19	3	d	John of the crosse.
8	4	e	Christopher.
	5	f	S. Augustine.
16	6	g	John Post lat.
5	7	a	John of Beuer.
	8	b	Appe. of Wich.
13	9	c	Trans. of St.
2	10	d	Corzdaine.
	11	e	Sunne in Gemini
10	12	f	Victorius Mar.
	13	g	Servatius Con.
18	14	a	Boniface Mart.
7	15	b	Sophia Virgin.
	16	c	Brandon Bishop
15	17	d	Trans. of Bar.
4	18	e	Dioscoz. martir
	19	f	
12	20	g	Dunstan Conf.
1	21	a	Barnardine.
	22	b	Helene Quene
9	23	c	Petronill:
	24	d	Julian Virg.
17	25	e	Desiderie mart:
6	26	f	Adelme. Conf.
	27	g	
14	28	a	Germaine Bish.
3	29	b	Nicodeme.
	30	c	Corone mart.
11	31	d	Felix Bishop.

Jane hath xxx. dayes.

19	1	e	Nicodeme.
	2	f	Crastinus.
8	3	g	Basill.
16	4	a	Marcel. Martir.
	5	b	Petrocius Conf.
5	6	c	Boniface bishop.
	7	d	Medard and Gil.
13	8	e	Trans. Comond.
2	9	f	Puan Confel.
	10	g	Tran. of Mel.
10	11	a	Barnabe Apost.
	12	b	Sunne in Taurus.
18	13	c	Anthony Confel.
7	14	d	Basilides con.
	15	e	Mate modelle.
15	16	f	Trans. Richard.
4	17	g	Botulph conf.
	18	a	Cruperie bishop.
12	19	b	Servatius mar.
1	20	c	Tran. Edward.
	21	d	Malburge Vir.
9	22	e	Albane Mart.
	23	f	Fast.
17	24	g	John Baptist.
6	25	a	Trans. of Elig.
	26	b	John and Pa.
14	27	c	Crescens mart.
3	28	d	Fast.
	29	e	Peter and Paule.
11	30	f	

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July.

The Kalender.

July hath xxxi. dayes.

19	1	g	St. John. Bap.
8	2	a	Milt. of Mary.
	3	b	Gregorie bishop.
16	4	c	Domitius mart.
5	5	d	Parthene Con.
	6	e	Procope Mart.
13	7	f	Zenone Mart.
2	8	g	Paterian Bish.
	9	a	Pius Bishop.
10	10	b	Dog daies be.
	11	c	Herinaco, for
18	12	d	Anacleto bishop.
7	13	e	Quirine & Ju.
	14	f	Sunne in Leo.
15	15	g	Marine Virgine.
4	16	a	Symph. cum 7.
	17	b	Arlene hem.
12	18	c	Barrede Vir.
1	19	d	Margar. Virg.
	20	e	Barrede Virg.
9	21	f	Appoline bishop.
	22	g	Mary Magda.
17	23	a	Christian.
6	24	b	Fast.
	25	c	James Apostle.
14	26	d	Anne mo. of Ma.
3	27	e	Panthalcon.
	28	f	Samplon Bish.
11	29	g	Mary Virgin.
	30	a	Abho. and Sen.
19	31	b	German Bishop

August hath xxxi. dayes.

8	1	c	Lammias.
16	2	d	Steven Bishop.
	3	e	Finding of Ste.
5	4	f	Iustine Priest.
	5	g	Festum iuiis.
13	6	a	Trand. domi.
2	7	b	Feast of Iesu.
	8	c	Cirack & his fel.
10	9	d	Roman. Mart.
	10	e	Laurence Mart.
18	11	f	Tiburt and Su.
7	12	g	Clare Virgin.
	13	a	Polite Virgin.
15	14	b	Sunne in Virgo.
4	15	c	Assump. of Mary
	16	d	Roche Confess.
12	17	e	St. Laurence.
1	18	f	Agapite Mart.
	19	g	Leues Bishop.
9	20	a	Dog dayes ende.
	21	b	Anastase Mart.
17	22	c	Limo and Hip.
6	23	d	Cleazoz. Fast.
	24	e	Barthol. Apostle.
14	25	f	Leues King.
3	26	g	Zepherine Bish.
	27	a	Kufus Mart.
11	28	b	Augustine Bish.
	29	c	John behead.
19	30	d	Felix and Auda.
	31	e	Cuthber. Virgin

September.

The Kalender.

September hath xxx. daies.

8	1	f	Giles Abbot.
16	2	g	Anthonye Mart.
5	3	a	Eupheme.
	4	b	Moyses Doct.
13	5	c	Wenturine.
2	6	d	Zacharie Prop.
	7	e	Enurce Bishop.
10	8	f	Patinitie of Pa.
	9	g	Cozgone Mart.
18	10	a	Nicholas de To.
7	11	b	Protere and Vi.
	12	c	Sire Bishop.
15	13	d	Philip Bishop.
4	14	e	Sunne in Libra.
	15	f	Nicodeme Priest
12	16	g	Edith Virgin.
1	17	a	Lambart Bishop
	18	b	Widoz and Coz.
9	19	c	Eustace.
	20	d	Fast.
17	21	e	Mathew Apostle.
6	22	f	Maurice.
	23	g	Line Mart.
14	24	a	German Abbot.
3	25	b	Cleophin & Ap.
	26	c	Cyprian & Jul.
11	27	d	Cosme and Da.
19	28	e	Erupere Bishop.
	29	f	Michael Arch.
8	30	g	Vierome Doct.

October hath xxxj. daies.

16	1	a	Remigius Bish.
5	2	b	Leodegar Mart.
13	3	c	Candide Mart.
2	4	d	Frances Mart.
	5	e	Faith Virgin.
10	6	f	Gerionis.
	7	g	Marce and Mart.
18	8	a	Apolinaris Mart.
7	9	b	Pelagi Virgin.
	10	c	Linus Conf.
15	11	d	Denice & his fel.
4	12	e	Nichasius Bish.
	13	f	Wilfride Bishop
12	14	g	Sunne in Scorpio.
1	15	a	Calixt Bishop.
	16	b	Wolfran Bishop
9	17	c	Nich of y Mount
	18	d	Luke Euangelist.
17	19	e	Etheldred Virg.
6	20	f	Frideswide virg.
	21	g	Austrebet virgin
14	22	a	ri. M. Virgins.
3	23	b	Mary Salome.
	24	c	Romane Bishop.
11	25	d	Magloze Bishop.
	26	e	Chrys. and Cris.
19	27	f	Fast.
8	28	g	Simon and Iude.
	29	a	Parcissus Bish.
16	30	b	Germaine Conf.
5	31	c	Fast.

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Nouem-

The Kalender.

November hath xxx. daies.

December hath xxxj. daies.

	1	d	All Saints.
13	2	e	All Soules.
2	3	f	Wenefride virg.
	4	g	Amantius.
10	5	a	Leto Priest.
	6	b	Leonard.
18	7	c	Wilborde.
7	8	d	Flower croun.
	9	e	Theodoze.
15	10	f	Marine.
4	11	g	Martine Bishop.
	12	a	Wife Bishop.
12	13	b	Sunne in Sagitt.
1	14	c	Tran. Erkenew.
	15	d	Macute Bishop.
9	16	e	Dep. of Comond
	17	f	Init. Reg. Elizab.
17	18	g	Dea Martine.
6	19	a	Elizabeth mart.
	20	b	Comond kind.
14	21	c	Pres. of Marie.
3	22	d	Cicely Virgin.
	23	e	Clement Part.
11	24	f	Grillogon Part.
19	25	g	Catherine Virg.
	26	a	Line mart.
8	27	b	Vitalis Conf.
	28	c	Rufus Mar:
16	29	d	Saturnt. Fast.
5	30	e	Andrew Apostle

	1	f	Elegi Bishop.
13	2	g	Liban Part.
2	3	a	Dep. of Osmond
	4	b	Barbara Virg.
10	5	c	Sabba Bishop.
	6	d	Nicholas Bishop
18	7	e	Dea Andzew.
7	8	f	Con. of Marie.
	9	g	Ciprian Bishop.
15	10	a	Eulalie Virgin.
4	11	b	Antippe.
	12	c	Damale Conf.
12	13	d	Sunne in Capric.
1	14	e	Picassus Virgin
	15	f	Othalie Virgin.
9	16	g	D Sapientia.
	17	a	Lazarus con.
17	18	b	Gratian Bishop
6	19	c	Menetia virgin.
	20	d	Fast.
14	21	e	Thomas Apostle
3	22	f	Frr Martirs.
	23	g	Widoz Virg.
11	24	a	Fast.
	25	b	Christmas daie
19	26	c	Stephen Mart
8	27	d	John Euang.
	28	e	Innocents daie
16	29	f	
5	30	g	Tran. of James.
13	31	a	Siluester Part.

A Table

A Table or Kalender for 24.yeeeres, shewing the Prime, the
Sundaies letter, and Leape yeare, and the mouable
Feasts, as the first Sunday in Lent, and Easter
daie, Ascension daie, and Whitsunday.

The year of our Lord	The Prime Letter.	Dominicall Letter.	First Sunday in Lent.	Easter day.	Ascension daie.	Whitsun- daie.
1579	3	b	8. March.	19. Aprill.	28. May.	7. June.
1580	4	cb	20. Febru.	3. Aprill.	12. May.	22. May.
1581	5	a	12. Febru.	26. March.	4. May.	14. May.
1582	6	g	4. March.	15. Aprill.	24. May.	3. June.
1583	7	f	17. Febru.	31. March.	9. May.	19. May.
1584	8	ed	8. March.	19. Aprill.	28. May.	7. June.
1585	9	e	28. Febru.	11. Aprill.	20. May.	30. May.
1586	10	b	20. Febru.	3. Aprill.	12. May.	22. May.
1587	11	a	5. March.	16. Aprill.	25. May.	4. June.
1588	12	gf	24. Febru.	7. Aprill.	16. May.	26. May.
1589	13	e	16. Febru.	30. March.	8. May.	18. May.
1590	14	d	8. March.	19. Aprill.	28. May.	7. June.
1591	15	c	21. Febru.	4. Aprill.	13. May.	23. May.
1592	16	ba	12. Febru.	26. March.	4. May.	14. May.
1593	17	g	4. March.	15. Aprill.	24. May.	3. June.
1594	18	f	17. Febru.	31. March.	9. May.	19. May.
1595	19	e	9. March.	20. Aprill.	29. May.	8. June.
1596	1	dc	28. Febru.	11. Aprill.	20. May.	30. May.
1597	2	b	13. Febru.	27. March.	4. May.	15. May.
1598	3	a	5. March.	16. Aprill.	25. May.	4. June.
1599	4	g	25. Febru.	8. Aprill.	17. May.	27. May.
1600	5	fe	9. Febru.	23. March.	1. May.	11. May.
1601	6	d	1. March.	12. Aprill.	21. May.	31. May.
1602	7	c	21. Febru.	4. Aprill.	13. May.	23. May.
1603	8	b	13. March.	24. Aprill.	2. June.	12. June.

A profitable and necessarie rule to knowe the beginning and ending of euerie Terme, with their Returnes.

Hillarie Terme beginneth the xxij. of January, if it be not Sundae, which then is referred vntill the next daie after, and endeth the xij. of Februarie, and hath foure Returnes, that is to saie :

Octauis Hilarij.	}	Crastino Purific.
Quind. Hilarij.		Octauis Purific.

Easter Terme beginneth xvii. daies after Easter, and endeth the Monday next after the Ascension day, and hath five Returnes, that is to saie :

Quind. Pasch.	}	Mense	}	Quinque. Paschæ.
Tres Paschæ.		Pasch.		Crast. Ascension.

Trinitie Terme beginneth the Fridaie next after Trinitie Sunday, and endeth the Wednesday foynight after, and hath foure Returnes, that is to saie :

Crast. Trinitatis.	}	Quind Trinitatis.
Octauis Trinita.		Tres Trinitatis.

Michaelmas Terme beginneth the ix. daie of October, if it be not Sundae, and endeth the xxvii. or xxix. of November, and hath eight Returnes, that is to say :

Octauis Michael.	}	Crast. Animarum.
Quind. Machel.		Crast. Martini.
Tres Michaelis.		Octa. Martini.
Mense Michael.		Quind. Martini.

Note also that the Crabequer openeth eight daies before any Terme begin, except Trinitie Terme, which openeth but foure daies before.

Thirtie daies hath September, Aprill, Iune, and Nouember, Februarie hath xxviii. alone; & all the rest thirtie and one.

AN INTRODV.

tion vnto the Regiment for the Sea.

The names of certaine things necessarie to be knowne of them that are Marriners or Seafaring men, meete to be knowne of them that doo practise Nauigation, as this: the names of the circles of the Sphere, and what they are, & their vses: & also the names of other things belonging therevnto, and what they are, and their vses.

First, what the Horizon circle is.

The Horizon is the parting of the Earth, or the Sea, and the Skie, that is to saie, the halfe of the heauens being aboue ouer your head, & the other halfe hidden with the earth or Sea vnder them: and this Horizon circle doth moue as you do moue: for as you doe by trauaile chaunge your place, so doth the Horizon chaunge in all points.

The vse of the Horizon circle.

The vse of the Horizon circle is this, to take the height of the Sunne, or any Starre, with the crosse staffe, setting the one end with the Horizon, & the other end with the Sunne or Starre, so that you haue a true Horizon: and that must be done vpon the Sea, or else it must be a very plaine ground vpon the top of a hill, else it is no true Horizon. And also if the Sunne or Moone, or any Starre bee to be seene, then they be aboue the Horizon: if they be not to be seene, then they be vnder the Horizon.

2. What the Meridian circle is.

The Meridian is a circle beginning due South, and so passing by your Zenith, that is right ouer the crowne
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of your head, and so by the two Poles of the world : and if you doe trauaile due South and North, you doe not chaunge your Meridian : but in the going or trauailing any other waie, you doe chaunge it.

The vse of the Meridian circle.

The vse of the Meridian Circle is, to knowe the iust time of Noone by the Sunne : for as soone as the middle of the Sunne is vpon the Meridian, then it is none, and when the Sunne, Moone, or any Starre is vpon the Meridian, then they be farthest from the Horizon, and it is a meete time to take their hight, for to knowe the altitude or height of the Pole of the worlde, whereby you maye perfectly knowe, how farre you be to the Southwardes, or Northwards of any place.

3 What the Equinoctiall circle is, being a paralel line, or circle fixed.

The Equinoctiall is a fixed circle in the heauens, equally distant from both the Poles, & both passe directly ouer the middle of the earth round about, and is called the Equinoctiall, for that if the Sun be there, then thorow all the whole world the Sun is 12. houres aboue the Horizon, & 12. houres vnder the Horizon, sauing vnder the two poles, & there the Equinoctiall is with the Horizon. So they shall see halfe the Sunne and no more, till the Sunne bee departed from the Equinoctiall, and also to them that doe inhabite or dwell in anie place vnder the Equinoctiall, the Sunne, Moone, and all the Starres, be twelue houres aboue the Horizon, and twelue houres vnder the horizon.

The vse of the Equinoctiall circle.

The vse of the Equinoctiall, is to knowe what declination the Sunne or any other Starre hath from it, and of which side, and by that is knowne the height of the Equinoctiall.

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quinoctiall, & by the height of that is knowen the height of either of the two Poles of the world.

- 4 What the circle or Tropicke of Cancer is, being a paralel circle fixed.

The Tropicke of Cancer, is the greatest declination that the Sunne doth come vnto the Northwardes, and then is our longest Summers dayes, and shortest nights.

- 5 What the circle or Tropicke of Capricorne is, being a paralel circle fixed.

The Tropicke of Capricorne, is the greatest declination that the Sunne doth goe vnto the Southwards, and then is our shortest Winter daies, and longest nights.

The vles of these two circles be but small, but that the daies being at the longest or shortest, the Sunne doth returne backe againe, &c.

- 6 What the Articke circle is, being a paralel circle.

The Articke circle doth touch the Horizon due North, and is according to the place that you are in, of any place vppon the face of the earth, & doth widen & narrow according vnto the altitude or height of the Pole: for as you do go vnto the South parts, then doth your Articke circle grow narrower and narrower, vntill you come right vnder the equinoctiall line, & then haue you no Artick circle: & if that you do goe vnto the North parts, then doth your Articke circle grow wider and wider: & where the North Pole is raised 66. degrees & a halfe, there y Articke circle is iust with the Tropick of Cancer, & then vnder y North Pole, there your Articke circle is with the Equinoctiall.

The vse of the Articke circle.

The vse of the Articke circle, is to know what starres doe neuer set vnto you, for all those Starres or lyghtes that you do see vnder the Pole, do not set: and if that you be vnto the Northward, of the height of the Pole, more

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than 66. degrees and a halfe : if that the Sunne or Moone be in the Tropicke of Cancer, they shall not goe downe vnto you vnder the Horizon, but shall be still in sight vnto you, so that they be not let by the cloudes and other accidents.

7. What the Antarticke circle is, beeing a Paralel circle .

The Antartick circle doth touch y^e Horizon due South, and is opposite or right against the Arctike circle, and doth wide and narrowe in all pointes, and doth not differ from the Arctike circle, sauing the Arctike circle is aboue the Horizon, and the Antartike circle is vnderneath the Horizon.

The vse of the Antarticke circle,

The vse of the Antarticke circle, is as the Arctike is, in all points to knowe what starres will not appeare aboue your Horizon, and in lyke manner, to the Northwardes of 66. degrees and a halfe. (the Sunne or Moone being in the Tropicke of Capricorne) then they will not rise aboue the Horizon.

8. What the Zodiacke is, being a circle.

The Zodiacke is the greatest circle in all the heauens, wherein all the wandering lightes or Planettes doe keep their courses, that is to saie, the Sun and Moone, and the other fixe Planets or starres, that is to saie, Saturne, Iupiter, Mars, Venus, & Mercurie, &c. which circle is diuided into twelue equall partes, called the 12. signes, as Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricornus, Aquarius, Pisces, the which circle standeth oblique or awrye, crossing the Equinoctiall in the middle at two places : the Northmost parte in the middle of the Zodiacke, and that is the Tropicke of Cancer : and the Southmost parte is the Tropicke

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of Capricorne, the very middle of the Zodiacke: and that lyne in the middle of the Zodiacke, is called the Eclipticke lyne, and the Zodiacke is 12. degrees broad, that is to say, sixe degrees from the Ecliptik line vnto the North parts, and sixe degrees vnto the South parts.

The vse of the Zodiacke.

The vse of the Zodiacke is, through the moving of the Sunne and Moone, and the other Planets, to knowe in what signe they be, and also to knowe the time of the chaunge of the Moone, with all the other aspects: and in like manner to know the aspects of all the other Planets vnto the Moone, and also the planets amongst themselves: and by the aspects in the xii. signes is gathered their effects, and in what Countrey it may happen.

9. What the line Ecliptike is.

The line Eclipticke, is a Circle in the very middle of the Zodiacke, the which the very middle or center of the Sunne doth goe vpon.

The vse of the line Ecliptike.

The vse of the line Ecliptick is this, if that the Moone or any other starre, be vnto the North part thereof, then it is said, that they haue North Latitude, and if vnto the South part, then they haue South Latitude: and also by this Circle called the line Eclipticke, is knowen the Eclipse of the Sunne and the Moone.

10. What the Articke polar circle is, being a parallel circle fixed.

The Articke polar Circle, is made by the pole of the Zodiacke, or pole of the circle Ecliptike, 23. degrees and a halfe in the heauens from the poles of the world, about the Horizon.

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11 What the Antarticke Polar circle is, being a Paralel circle fixed.

The Antartick Polar circle, is iust opposite vnto the Articke Polar, made by the Antarticke pole vnderneath our Horizon. The vse of the I will declare, when I speak of the Poles of the Eclipticke or Zodiacke.

12 What the two circles called Colures be, &c.

The 2. Circles called Colures, be those that do deuide the Zodiacke, and all the other paralel circles, into foure equall parts, the one of the circles doth crosse the Zodiack in the first point of Aries and Libra, and so passeth by the 2. poles of the world, and is called the equinoctial colure: and the other Colure circle doth crosse the Zodiack in the first point of Cancer & Capricorn; and so passeth the 2. Poles of the world, & there at the 2. poles the one circle doth crosse the other: & that is called the Solstitiall Colure.

The vse of these two circles.

The vse of the 2. Colure circles is this, the Sunne passing by them, doth deuide the yeare into 4. parts: as this, the Sunne in the first point of Aries is spring time, &c.

13 What the 2. Poles of the world is, imagined to be as an Axiltree.

The 2. Poles of the worlde, imagined to be as an Axiltree, (that is to say, the North Pole called the Pole Artick, & the South pole called the Pole Antartick) the one is directly against the other: the North Pole alwaies above our Horizon, & the South pole Antartick alwaies vnder our horizon, being fixed fast in the heauens, & the Equinoctiall iust and equally betweene them: & the cause why that is imagined to be an Axiltree is this, for that the whole heauens, and all the lights of the firmament be carried round about from the East vnto the West in euery. houres:

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houres : so that no light nor place remaineth unremoued, but onely the 2. Poles of the world.

The vse of the Poles of the world.

The vse of the 2. Poles is this, to know, how farre we do transport our selues, and to know what Climate and temperatenesse we be in, as touching heate and colde,

14 What the 2. Poles of the Zodiacke is, imagined to be an axiltree in the heauens.

The 2. Poles of the Zodiacke or Ecliptick, imagined to be as an Axiltree, (the Artick Pole of the Zodiack or rather the Eclipticke, and the Antartick Pole of the Zodiack) the one being directly against the other, and the Zodiacke or rather the middle thereof, called the Eclipticks, to be iust or equall betwene them, are called the poles of the Zodiacke: for that the Sunne & the Moone, and the other Planets and fixed stars do moue vnto the Eastward, according to the standing of the Zodiacke, &c.

The vse of the Poles of the Zodiacke.

The vse of the 2. Poles of the Zodiack is this, (as it is before declared) that the Zodiacke is deuided into 12. equall parts, called the 12. signes, and those diuisions by imagination do passe vnto the Poles of the Zodiack, in such sort as the Meridian lines do all meete at y poles of the world, & so do all those diuisions meete at the two poles of the Zodiack, and then any starre, y is out of the Zodiack, either vnto the Southwards or Northwards, (according vnto those diuisions, they be called in y signes.

15 What the Zenith or verticall point is, imagined to be as an Axiltree.

The Zenith or verticall point, is imagined to be a picke in the heauens right ouer the crown of your head, and

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and is moueable as we our selues be, and is as an Arbre tree vnto the Horizon Circle: and as you doe transporte your selfe from one place vnto another, so dooth your Zenith or verticall point, and your horizon circle also.

The vse of the Zenith or verticall point, &c.

The vse of the Zenith or verticall point is this, to know how néere or how farre off, any star is from your Zenith, by taking the true height of any starre with an instrument, for that from your Zenith, is alwayes 90. degrees downe vnto the Horizon on euery side round about you, as it shal moze plainly appeare héer after, wher I speake of Degrees.

18 What a degree is.

A Degree is the part or deuision of a whole Circle into 360. equall parts, how big or small soeuer the circle be.

The vse of the degrees is manifold.

The vse of the degrees, is to know by the Sunne and Moones course in the Zodiacke, or any other of the Planets or moueable starres, how many degrees they be asunder: wheroby is knowen at what time they haue any aspect the one with the other. And also by the degrees it is knowen what latitude and what declination any light or starre hath from the Eclipticke or Equinoctiall: and also the degrees wil shew vnto you how many miles that you doe transport your selfe, vpon the earth to the South or North parts, for that euery degree dooth answer vnto 60. English myles, in the going South and North: which is knowen by the altitude of the North pole, or the number of degrees betwene the Equinoctiall & your Zenith or verticall point, for from your Zenith vnto the horizon, is 90. degrees to the Southwards, and 90. degrees vnto the Northwards, which is halfe the compass

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part of the heavens, for twice 90. is 180. and then the earth doth bid the other halfe of the heavens: and twice 180. maketh 360. the whole contents of the compasse of every great Circle in the heavens.

17 What a minute is.

Of minutes there be two sorts, minutes of time, and minutes of measure, and is no other thing but the lesser part of time or measure, which is the 60. part of a Degree, or the 60. part of an houre; and all the divisions in these matters is by 60. For as 60. Minutes is a degree, or an houre, so 60. seconds is a minute, and 60. thirdes is a second, and 60. fourths is a third, &c.

18 Altitude is height: the vse thereof.

Altitude is the height of anye thing taken, as the height of the Sunne or any starre, or the height of the Pole, above the horizon: or the height of a steeple, or tower, or such other lyke.

19 Latitude is widenesse: the vse thereof.

Latitude is in the heavens: if the Moone, or any other starre be unto the South parts or the North parts of the Eclipticke, that then it is sayd, to be so many degrees in latitude or widenesse, from the line Eclipticke to the South or North part: and also Latitude is counted upon the earth in like manner, if that you be in any place betwene, from under the Equinoctial, either to y^e South or North part, betwene any of the two Poles, that you are so many degrees in latitude from the Equinoctial, &c.

20 Longitude is length: the vse thereof.

Longitude in the heavens is, if the Sunne or Moone or any other starre, be in such a signe, and so many degrees:

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grées: that then it is sayde, that they haue longitude in such a signe, and so many degrees. And also longitude upon the earth, is counted from the Canarie Ilandes vnto the Eastward, as this, if that any towne or Citie, be vnto the Eastward so many degrees from the Canarie Ilandes, then it is said, that the Citie or Towne is so many Degrees in longitude, whereby is knowen the time of the chaunges of the Moone, or any other aspect, or any Eclipse of the Sunne by Moone at the Citie or towne.

21 Declination is leaning: the vse thereof.

Declination is counted in the heuens, if that the Sun or any other starre be vnto the North part or South part of the Equinoctiall, then it is said, that the Sunne or star hath so many degrees of declination to the South, or to the North parts as it happeneth, &c.

22 Circumference is the compasse of a circle by the outer edge.

23 Diameter is the breadth of a circle, passing right ouer the center or middle thereof, from outside vnto outside.

24 Center is the middle picke in any circle, equally distant from the edge of the circle in euery place.

25 A Paralel line or Circle is, if two lynes or more, (how many soeuer there be) be equally distant in euery place alike, being right lites.

26 Auge, what it is.

Auge is a point in the heauens, when the Sunne or Moone is excentricke, going nearer vnto the heauens, and farther from the Earth, than her common order is: and the opposition thereof is, when that the Sunne & Moone doe come nearer vnto the earth, than they doe at any other time.

The vse thereof.

The vse thereof is, to knowe when that they be in their

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their swift motion, or in their slow motion: in the point of Auge, they be in their slow motion, in the opposition thereof in their swift motion.

27. Excentrex, what it is.

Excentrex is, when either the Sunne or Moone are towards the point of Auge, or the opposition thereof, and then the Center of the Sunne or Moones sphere is not in the Center of the Earth: the vse thereof is shewed in the Auge.

Additiōs.

28. What the head or tayle of the Dragon is.

The head of the Dragon, is the place where that the Moone dooth come over the line ecliptick, from the South part unto the North part: and the taile of the Dragon is, where the Moone passeth over the lyne ecliptick, from the North part, unto the South part.

The vse of the head and taile of the Dragon.

The vse of the head and taile of the Dragon, is to know, when that there is any Eclipse of the Sunne or Moone: and of what quantitie or greatnes the Eclipse is.

29. Paralex what it is.

Paralex is, when that the Moone or the two Planets Venus or Mercurio, are in coniunction or neere any star, by the meanes of the Deameter or thicknesse, that the superficies is from the center of the earth, and the neernes of them unto the earth, that so accordingly, that in some parts of the Skyes it shall seeme neerer or farther unto those starres, than in some parts, which reason groweth by the Circumdeameter of the earth, so that you are not in the Center, when that you do behold it.

Additiōs.

B.ij.

The

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The vse thereof.

The vse of Paralex is manifolde, for that it sheweth where and in what countreyes that the Sunne is eclipsed as in some places the Sunne may be all wholly Eclipsed and in some place halfe eclipsed, and in some parts of the earth nothing eclipsed at all, and yet the Sunne and the Moone both about the Horizon, which reason is before shewed. And also the vse of Paralex is, if that you doe see any extraordinary light in the heuens, as Comets or blazing starres, by their Paralex their distaunce is knowen what they are from the earth, and by their distance their Diameter being taken, then the magnitude of the body is knowen, therefore there be great things to be knowen by the obseruation of the Paralex.

30. What Nauigation is.

Nauigation is this, how to direct his course in the sea, to any place assigned, and to consider in that direction, what things may stand with him, and what things may stand against him, hauing consideration how to preferus the ship in all stormes and changes of weather that may happen by the way, to bring the shippe safe vnto the port assigned, and in the shortest time.

The vse of Nauigation.

The vse thereof is this, first to knowe how that the place dooth beare from him, by what winde or point of the compasse, and also how farre that the place is from him, and also to consider the streame, or tide gates & Currents, which waye that they doe sette or dyue the shippe, and also to consider what dangers is by the waye, as Rocks and Sandes, and such other lyke impediments, and also if that the winde change or bliste by the way, to consider which way to stand, and directe his

his course vnto the most aduantage, to attaine vnto the port in shorrest time : and also if any stormes do happen by the way, to consider how soeuer to preserve the ship and the goods, and to bring her safe vnto the port assigned. And also it is most principally to be considered and foreseene, that if they haue had by occasion of a contrarie tempest, soeuer to goe verie much out of the course or waie, to knowe then how that the place doth then beare, that is to say, by what point of the compasse the place doth stande from you : and also how farre it may be from you. Which way to be knowne, is this : First, to consider by what point that the ship hath made her way by, and how fast or slowly that the ship hath gone, and to consider how often that the ship hath altered her course, and how much that shee hath gone at euerie time, and then to consider all this in your plat or card, & so you may giue a nere gesse, by what point or winde it beareth from you, and also how farre it is thether . And also you may haue a great helpe by the Sunne or starres, to take the height of the pole aboue the Horizon , and also in some place you may gesse by the sounding, both by the depth & also by the ground. And also it is verie meete and necessarie to knowe any place when that he doth see it.

31 Of Instruments to vse at the Sea, for to take the height of the Sunne, or any Starres.

ALL Instruments to take the height of the Sunne or any Starre , the originall of the making thereof, it is either a Circle, or the parte of a Circle , whose diuision is the 360 . parte of a Circle, what forme so euer that it hath , as your crosse staffe it is marked according vnto the proportion of a Circle : and euerye one of the degrees is the equall parte of a Circle the three hundred and fiftie part, &c.

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The vse of the Instruments.

The vse of the Instruments, as Astrolobes, or common rings, or the crosse staffe, is to take the height of the Sunne or other starres, whose vses doe followe hereafter in the booke.

32 What manner of persons be meetest to take charge of ships in Nauigation.

As thouching those persons that are meete to take charge, that is to say, to be as Master of ships in Nauigation, he ought to be sober and wise, & not to be light or rash headed, nor to be too sumish or hastie, but such a one as canne well gouerne himselfe, for else it is not possible for him to gouerne his companie well: he ought not to be too simple, but he must be such a one as must keepe his companie in awe of him (by discretion) doing his companie no iniurie or wrong, but to let them haue that which men ought to haue, and then to see vnto them that they doe their labour as men ought to doe, in al points. And the principal point in government is, to cause himselfe, both to be feared and loued, & that groweth principally by this meanes, to cherish men in wel doing, and those men that be honestly adicted, to let them haue reasonable preheminence, so that it be not hurtfull vnto the Merchant, nor to himselfe, & to punish those that be malefactors & disturbers of their companie, and for small faults to giue them gentle admonition to amend them: and principally these two points are to be foresene by the Masters, (that is) to serue God himselfe, & to see that all the whole company do so in like manner, at such conuenient time as it is meete to be done: the second point is, that the master vse no playe at the dice or cards, neither (as nere as he can) to suffer anye, for the sufferance thereof may do very much hurt, in diuers respects: and furthermore, the master ought to be such a one,

as

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As doth know the Moones course, whereby he doth know at what time it is a full sea, or a low water, knowing in what quarter or part of the Skie, y^e the Moone doth make a full sea at that place, and also the master ought to bee acquainted, or knowe that place well, that he doth take charge to goe vnto (except that he haue a Pilot) and also he that taketh charge vpon him, ought to be expert howe the tide gates or currents, doe set from place vnto place: and also not to be ignorant of such daungers as lieth by the way, as rockes, sands, or bankes, and also most principally, he ought to be such a one as can verie wel direct his courses vnto any place assigned, & to haue capacitie howe for to handle or shift himselfe in foule weather or storms. And also it behoueth him to be a good coaster, that is to saie, to know euerie place by the sight thereof. And also he that taketh charge for long voiaiges, ought to haue knowledge in plats or cards, & also in such instruments, as bee meete to take the height of the Sun or any starre, and to haue capacitie to correct those instruments, & also he ought to be such a one, that can calculate the Sunnes declination, or else to haue some true regiment, and also he ought to know how to handle the Sunnes declination, when that he hath taken the height of the Sunne.

Now beginneth the Regiment for the Sea, the first Chapter of Nauigation, and sheweth what the 32. pointes of the Compasse is, and to what vses they doe serue.

THE first and most principall thing for any Seafaring man, or trauailer, is to knowe toward what part of the Earth he meaneth to goe, and then being vpon the Sea, there he seeth no path nor marke to trauaile by, but onely the vse of the needle or compasse. And to shew y^e cause how they in old time did find them or called them, is sufficiently declared by other, but this is to be noted: there
be

The Regiment for the Sea.

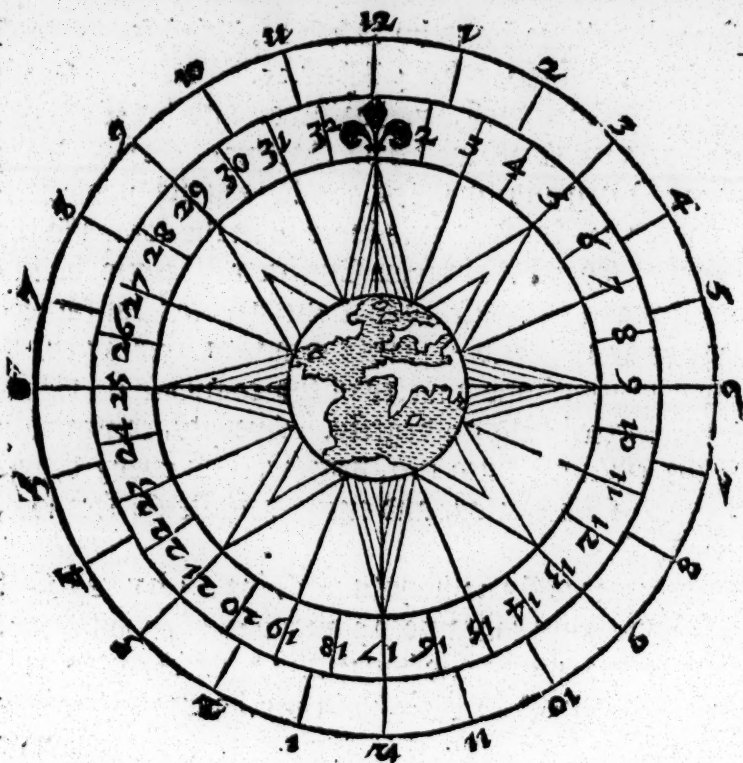
Eight capital
points or
head
pointes.

Eight inferior
points or
windes.

16. by-
points or
windes.
Additiōs.

by eight capital or head windes or points, whereof foure of them are called Cardinales, and haue theyr names properly of themselves, and the other foure of them, are deriued or take their names of the other foure, as this: South cometh directly from the Meridian, and North is directly against it, and East cometh from the Equinoctial point, towarde the partes of the Sunne rising, and West is right against it. Northeast is in the midway, betwene the East and the North, and Southeast in the midway betwene the East and the South, and South-west betwene the West and the South, and North-west is in the middle betwene the North and the West. And then there be eight inferior points or windes, halfe way between euery one of those eight capital or head points or windes, & those haue y names of the two points y he standeth betwene, as y point y standeth betwene the North and the Northeast, is called North Northeast, and that point betwene the East and the Northeast, is called East Northeast, and also that point that is betwene the East and the Southeast, is called East Southeast. And so forth vnto the rest of the eight pointes, whose names doth solow, as South Southeast. and South South-west, & west South-west, & west North-west, & north-north-west: and now betwene euery one of these inferior points, and euery one of the head windes ther is a by-point or wind, and he is called a by-point, for that he is not named but by the name of one of the head pointes next adioyning. There be 16. of them in number, so that there be eight capital or head pointes, and eight inferior pointes, and 16. by-pointes or windes, so that in all there bee 32. of them. The vse of these pointes is, to direct the shippe to what quarter of the worlde you doe assigne, to keepe that course, to finde the place so assigned, for that the propriety of the Needle or Flie, is alwayes to stand due South and North.

As



As touching Navigation, for the instructions of the meanest, I have set this figure of Compass, where first is to be noted the 32. windes and points of the compass above made. The Flouredeluce is the first point, and these be the names beginning at the North, and so with the course of the Sunne, according vnto the common order that Sea men doth teach or instruct theyr youth, which is this. North. 1. North and by East. 2. North Northeast. 3. North east and by North. 4. North east. 5. Northeast & by East. 6. East Northeast. 7. East & by North. 8. East. 9. East and by South. 10. East South east. 11. Southeast and by East. 12. Southeast. 13. South east and by South. 14. South Southeast. 15. South and by East. 16. South. 17. South and by West. 18. South South west. 19. South west and by South. 20. South west. 21. South and by West. 22. West South west. 23. West. 24. West and by North. 25. West North west. 26. West North east. 27. North west and by North. 28. North west. 29. North and by West. 30. North Northeast. 31. North east and by North. 32. North east.

The names of the 32. points of the compass.

C. west

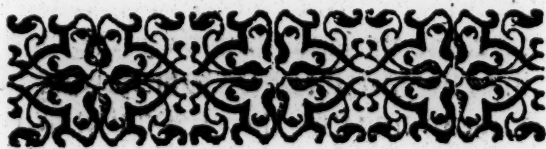
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The contents of the Equinoctial circle. 360. Degrees: one poynt of the Compass containeth. xi degrees & a quarter.

west. 21. Southwest and by West. 22. West Southwest
23. West and by South. 24. West. 25. West & by North
26. West Northwest. 27. Northwest and by West. 28.
Northwest. 29. Northwest & by North. 30. North North
west. 31. North and by West. 32. This is the whole con-
tents of the 32. Windes, and there is in the compasse the
contents of the great circle, or Equinoctiall circle, being
360. Degrees in compasse, so that euery point containeth
11. degrees and 4'. and 4. points containe 45. degrees. 8.
points containeth one quarter of the compasse or Equi-
noctiall Circle, being 90. degrees. 16. points, containeth
halfe the circumference 180. degrees, and euery degree
containeth 60. minutes, and euery minute 60. seconds,
and so forth.

The 32. poyntes brought into 24. houres,

Furthermoze the 32. poyntes containe 24. houres, that
is to say, one point containeth 3. quarters of an houre 45.
minutes: and 2. points one houre and a halfe: 4. points. 3.
houres: 8. points 6. houres: 12. points: 9. houres: 16. points
12. houres, and so to the rest of the points. And euery
houre containeth 60. minutes, and euery halfe houre 30
minutes, and euery quarter of an houre 15. minutes, and
after that rate 45. minutes maketh three quarters of an
houre.



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The second Chapter treateth of the Golden number or Prime, shewing the Epact, and by the Epact, to knowe the age of the Moone,



It is necessarie and conuenient for the seafaring men, to know the Prime or golden number: for by the golden number is known the Epact, and the Epact sheweth the age of the Moone or chaunge day, within 12. houres vnder or ouer: and by the age of the Moone, you may know at what a clock it doth flow in any place that you doe knowe what Moone doth make a full Sea: therefore it is meete to know the Epact, and that is known by the Prime, or Golden number. The cause why it was called the golden number, was because it was sent out of Aegypt in letters of golde, to the Romanes or Citie of Rome.

The cause why that it is called the Prime, was for that it was the first order that the Moones course was known by, & it is thus known. Adde one to the yeare of our Lord that you would knowe the Golden number or Prime of, then deuide the number by 19. the remainder is the Prime: and multiply that by 11. and looke what the number cometh vnto, deuide that by 30. the remainder is the Epact. Then when you haue once the Epact, adde 11. to your Epact for every yeare more, and looke what that cometh to, that is your Epact: and if it doe passe 30. put that away, and keepe the remainder for your Epact. And thus this rule will serue for euer, sauing when the Prime beginneth at one, for then the Epact is 11. & then doe (as aforesaid) as you may perceiue by this table here following.

The cause why that it was called the Prime or Golden number

To know how many the Epact is.

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The Table of Prime and Epact

for xix. yeares, and when those xix. yeares
be ended, then beginne againe,
and so it will serue for
euer,&c.

The yere of the Lorde	Prime.	Epact.	The yere of the Lorde.	Prime.	Epact.
1579	3	3	1589	13	23
1580	4	14	1590	14	4
1581	5	25	1591	15	15
1582	6	6	1592	16	26
1583	7	17	1593	17	7
1584	8	28	1594	18	18
1585	9	9	1595	19	29
1586	10	20	1596	1	11
1587	11	1	1597	2	22
1588	12	12			

The
Prime is
the time
of 19.
yeares.

The Prime or golden number, is the time of 19.
yeares, in the which time the Moone maketh all
her chaunges or coniunctions with the Sunne,
and when these nineteene yerres be expired, then
she beginneth againe: as for example. This yeare being
the yeare of our Lord, 1579. she chaunged the 26. day of
March, and euery yeare doth alter 11. daies of her change,
till the yeare 1598. and then she changeth the said 26. day
of March againe, as I shewed you before: the epact is the
putting to 11. for euery yere. Now furthermore to know
the age of the Moone, do thus, take y number of y Epact
for your yere (beginning at March alwaies) & recke how
many months it is from March, (counting March for one)
then

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then reckon how many daies of the moneth it is, in which you wold know the age of the Moone: Then put all your numbers together, (that is to saie, your Epact, your moneth from March, and euery day of the Moneth) then looke how many it amounteth vnto, that is the age of y^e Moone, but if it passe 30. throw all the 30. awaye, and keepe that which wil not be 30. for when the age of the Moone is iust 30. then is it the change daie: and if it be the fiftenth day of the age of the Moone, then y^e Moone is at the full. Whē the age is betwēne seuen daies and eight, then is the first quarter. And if it be 22. daies old, then y^e Moone is at y^e last quarter: as for example, this yere 1579. I looke and finde the Epact 3. for the yere: now I wold knowe the age of the Moone the 13. day of June. Now I reckon how many moneths it is from March, reckening March for one, and I find it is foure moneths: then I take and adde all these together, that is to say 3. for the Epact, and foure for the moneths (that is to say, March, Aprill, May, June,) & then 13. for the dayes of the moneth, and all cometh to 20. So that you may conclude, that the Moone is 20. dayes olde, & was at the full 5. dayes before.

To know
the age of
y^e Moone,
by the nū
ber of the
Epact.

¶ The third Chapter treateth how to know by the age of the Moone, what houre it doth flow, or is full Sea at any place, where you doo know what Moone maketh a full Sea.

Now by the age of the Moone you may know at what houre it is a full sea in any place where you do know what Moone maketh a full sea, which rule commonly the sea men cal, the shifting their Sunne and Moone: & many wayes there be to doe it, for thus they may do it: let them diuide one houre into fise parts, & then take foure of those parts, and put the fift part away, that serueth for the alteration of 24. houres, and the foure fift parts of an houre are 48. minutes, & the fift part of an houre is 12. minutes.

To know
the alte-
ration of
the tides.

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in 24.
houres,
An ensam-
ple for y^e
full Sea
vpon the
lands end,
for euerie
day of the
age of the
Moone.

A flood and an ebbe doth alter 24. minutes forwards :
as this for example : it floweth 12. of the clocke at the
lands end, vpon the chaunge daie, the Moone being in the
South, at all times a full Sea. The Moone being one day
olde, it floweth 12. of the clocke 48. minutes. 2. dayes olde,
it floweth one of the clocke 36. minutes, three dayes olde,
it floweth 2. of the clocke, 24. minutes: foure dayes olde,
it floweth 3. of the clocke 12. minutes: five daies olde, it
floweth 4. of the clocke iust sixe dayes olde, it floweth 4.
of the clocke, 48. minutes: seuen daies olde, five of y^e clock
36. minutes, eight daies olde. 6. of the clock. 24. minutes :
nine daies olde, seuen of the clocke. 12. minutes: ten dayes
olde, it floweth 8. of the clocke iust: eleuen daies olde 8. of
the clocke 48. minutes. 12. dayes. 9. of the clocke. 36. mi-
nutes: 13. daies old. 10. of the clocke. 24. minutes. 14. dayes
old, it floweth 11. of the clock. xij. minutes, xv. daies olde, it
floweth xii. of the clocke iust, then being the full Moone: &
so begin againe as you did befoze at one day olde, and so
forth. For y^e course of the tides is nothing else but to adde
for euerie daie of the age of the Moone an houre, pulling
backe the fifth part of an houre (being xii. minutes) and by
this account, you may at all times know at what a clock
it doth flow, by putting to euery flood and ebbe xxiiii. mi-
nutes, & to ii. floods and ii. ebbs putting to 48. minutes.
Now furthermore, the seamen vse to make their account
by this meanes (but it is all one) they do allow for euerie
day of the age of the Moone, one point & three minutes :
for a point of the compasse containeth. 45. minutes, that is
3. quarters of an houre. When they put 3. minutes to 45.
minutes, which maketh 48. minutes, the said 3. minutes is
the xv. part of a point, & from the change to the full is xv.
daies, so y^e (the halfe compasse being xvi. points) they breake
the odde point into xv. parts, & y^e commeth to 3. minutes,
so y^e the alteration of the tides, for euery xxiiii. houres be
48. minutes, or the 4. fifth partes of an houre. Wherefoze
there

To shifte
the Sun
and the
Moone
by the
points of
y^e compas.

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There shall followe a table of tides, about certaine places of this realme : for euery Moone containeth xxix. daies. xii. houres. 44. minutes fro change to change: the whole contents of the houres of the Moone, bee 708. houres, and 44. minutes. And there is in euery yere xii. chaunges of the Moone : & the yere containeth 365. daies. 5. houres. 55. minutes. xiii. seconds. Yet some do affirm to be odde 6. houres, but there lacketh 4. minutes. 47. secondes in the tropicall yere. Likewise in the yere be xii. moneths agreeable to the xii. Moones : the xii. Moones containe but 354. daies, so y there be xi. daies more in the yere, than there be in the xii. Moones. The yere also is diuided into xii. moneths, which moneths haue taken their names at the will & pleasure of men : as first January was so called of Ianus, because of two heads: for the month of January beholdeth the end of the yere past, & the beginning of the yere to come. February toke his name of certaine Romane Sacrifices, called Februa. March is so called of Mars, for Romulus so named it after his father. Aprill comes of Aperio, because y then the earth is opened, May of Maia, the mother of Mercury. June so called by preparing to the war. Iuly of Iulius Caesar : & August of Augustus Caesar, for in that month he entered the Consulship: then y rest of y months toke their names of their number from March. Now these xii. Months which maketh the yere, the Sun doth passe or go through the Zodiack called y xii. signes, which is y occasion of the yere: for this is to be noted, that y Sun, as I said before, doth goe by his naturall mouing in 365. daies. 5. houres. 55. minutes. xiii. seconds, through the zodiack, containing 360. degrees, his course being against y. xiiii. houres, going from the west into the East, against the course of primum mobile, or first mouer, being moued by the mightie prouidence of God, which maketh y xiiii. houres: & so doth all the 7. lights or planets, (except) that it be in their retrogration: but the Sunne and the Moone

The contents of y nuber of daies and houres in one Moone: the houres in euerie Moone be 708. 44. minutes. The content of a yere is 365. daies 5. houres, 55. minutes. How the moneths toke their names.

The Zodiack containeth. 360. degrees. The mouing of 24. houres be

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be neuer retrograde, as the other 5. planets or lightes be:
 The time And this is to be noted, that the Moone goeth faster then
 that the the Sunne, for she goeth through the whole Zodiacke,
 Moone in 27. dayes and eight houres. Now in that same time
 goeth thro the Sunne is removed by his naturall moving from
 rowv. the that place of the Zodiacke nere 27. degrees: and then
 12. signes. because that the Moone hath not found the Sunne there,
 it is two dayes, foure houres, and foure and fortie mi-
 nutes more, before that the Moone ouertaketh the Sunne
 againe, so by that meanes, it is 29. dayes, twelue
 houres, and 44. minutes betwene the chaunge of the
 Moone, and the next chaunge, one Moone with another,
 thoro the yeare, although that the Moone may chaunge
 sometime in lesse time, and sometime in longer time,
 that is by the meanes of the three motions of the Moone,
 The three motions of the Moone. that is to say, her swift motion, and her middle motion,
 and her slow motion, which groweth by the meanes of
 the Moones Auge or opposition thereof. The Moone bee-
 ing in Auge, goeth but little more then twelue degrees in
 Of Auge. 24. houres And in the opposition of Auge nere 15. degrees
 in 24. houres, and in her middle or equall motion 13. de-
 The cause why the Moone changeth rather or later. grees 12. minutes. So this is the occasion why some-
 time the Moone may chaunge sooner or be detracted lon-
 ger then the time of 29. dayes, 12. houres, and 44. mi-
 nutes. This point of Auge is moueable, and doth passe
 thoro the Zodiacke in the time of 19. yeares: and it
 causeth sometime the full of the Moone to happen sooner
 and later. In like manner also the quarters of the Moone
 with all the other aspects that the Moone hath wyth the
 Sunne, or anye other of the Planettes according to the
 Moones motion. In like manner (by the meanes of the
 3. motions of the Moone) sometime the Moone goeth more
 The Moone goeth in 24. houres sometimes then one point and 3. minutes, in 24. houres, & sometimes
 lesse then one point and 3. minutes, as this for example:
 the Moone being in her slow motion, goeth but little more
 then

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then 12. degrees in 24. houres, & then the Sunne in that time doth go one degree: and then is there but 11. degrees betwene the Sunne and the Moone, (that is but 44. minutes.) So that the Moone is not one point in 24. houres from the Sunne. But being in her swift motion she goeth nere 15. degrees in 24. houres, and the Sunne goeth one degree in that time: so that there is 14. Degrees in xxiii. houres, betwene the Moone and the Sunne, (that is 56. minutes) which is a point, and 11. minutes. Wherefore I do thinke it very necessarie for to show somewhat of the Moones motion, that they maye knowe when that the Moone is either in her swift motion or her slow motion, for that I do know that there is not in respect, no Seamen that doth know it. For that I do know no one Seaman that hath any sight or knowledge in the Moones Theorax, therefore let them note these few words following.

more degrees, and sometime fewer degrees.
The Moone is not one point asunder from the Sunne in xxiiii. houres. Additions.

When that the Prime is one, then the point of Auge is in the first part of Aries, then the Moone being there, she is in her slow motion. So in lyke manner the Moone being in Libra, in her swift motion for that it is the opposition of the Moones auge, and so in the tyme of 19. yeares, the point of auge doth go thorough the 12. signes So that in 9. yeares and a halfe, the point of Auge is in Libra, and then the Moone being in Libra, she is in her slowe motion, going about 12. degrees in xxiii. houres. So that then the Moone being in Aries, she goeth 20. degrees, in xxiiii. houres, for that there is the opposition of auge. And also when the Prime is five, then the point of auge is in Cancer, and then there being in her slowe motion, So that when that the Moone is in Capricorne, then in her swift motion. And when the Prime is xiiii. or xv. then the Moones auge is in Capricorne, and then there the Moone is in her slow motion, and also in Cancer her swift motion. And this by considering what that the

D.

Prime.

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Prime is, you may know where that the Moones Auge is, which is very necessary for Seamen for to knowe in diuers respects. For if that the Moone doth come from her swift motion, then it causeth the chaunge, quarter, or full of the Moone to be the rather. But contrariwise, when that the Moone commeth from her slow motion, then that doth detract the time the longer before the Moone doth chaunge, or is at the full or any other aspect.

The
Moone is
in .xxiii.
houres 1.
point and
11. Mi-
nutes afu-
der from
the sunne
Errour of
Marriners

And thus much I haue said of the Moones motion: for that some Seamen will take vpon them to correct the Almanackes as touching the chaunge and quarters of the Moone: holding this opinion, that euery Moone ought to be equall in the number of the daies and houres: & the full Moones to be iust the halfe contents. And the quarters in lyke manner, the iust fourth parte in daies and houres, so that some of them will take vpon them to tell (by the rule of the Epact,) the true houre of the chaunge, quarters, and full of the Moone. Wherein they are notably deceiued.

Againe, sometime in the yeare you shal see the Moone rather than at some other time, as this for example. From Januarie to Iune, you shall see the Moone within .xxiii. houres after the chaunge, because she hath North declination of the Sunne, and maketh a bigger Arche than the Sunne. From Iuly to December, you shall not see the Moone three daies after the chaunge, because her declination is to the South part of the Sunne: but you maye see her in .xxiii. houres before her chaunge. Now the Seamen doe imagine a Prime day, which is the halfe quarter of the Moone: that is, when the Moone is 3. daies and 18. houres old, (the Moone being then 4. points to the Eastward of the Sunne, which is three houres:) the same rule may they in like case obserue when the Moone is past the full three daies and 18. houres, and also in the middes of the quarters.

Heere

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Heere followeth a Table of Tides.

First, the Mone South or North, on Landes end full Sea.

The Mone South and by East, at the Coze ende full Sea.

The Mone South Southwest, betwene holy Island and Tinemouth, full sea.

It floweth betwene Tinemouth and Flambrough head, Southwest and Northeast Mone.

It floweth betwene Flambrough head, and Bridlington in the Bay, a Southwest and by west Mone.

The Mone in the west Southwest, betwene Bridlington and Laurenas, full sea.

It floweth between Laurenas and Cromer all along the well: and East and west Mone.

It floweth betwene Cromer and Parmouth Rode, to Laystow North Rode, a Southeast Mone.

It floweth betwene Laystow Rode and Dyfordenae, a Southeast and by South Mone.

It floweth betwene Dyford and Dywell waues, a South Southeast Mone.

It floweth betwene the Sas and the Ware heade of Colne, a South and by East Mone.

It floweth at the Spittes, and at the Sheue, and all alongst the Swinne, a South Mone.

At the west ende of the Noxe, a South and by west Mone full sea.

It floweth at Grauesend, a South Southwest Mone.

It floweth at London bridge, a Southwest Mone.

It floweth at the North Forland, a South Southeast Mone, and so alongst the Coast till you come to Bechey. And in the Dissing from the North Forlande to the South Forland, it runneth half tide. And from y South

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Forlande to the Pas, the tide runneth halfe tide halfe quarter. And from the Pas to Fairely, it runneth halfe tide: and from Fairely to Beche, it runneth quarter tide vnder other.

It floweth to the Westward of Beche, a kenning, a Southeast and by South Done.

It floweth at Portesmouth, a South and by East Done.

It floweth at S. Clens a South Southeast Done.

It floweth on the Sea side of the Iland, a Southeast and by South Done: and so on the land, and at the Pædles, and runneth quarter tide in the Offing.

It floweth at Poole in the Hauen: a Southeast Done.

It floweth at Weymouth: an East & West Done.

It floweth at Portland: a Southeast Done.

It floweth from the West part of Portland, till you come vnto Plimmouth, an East and West Done.

It floweth on the shore from Plimmouth to the Lyzard: a West and by South Done. And in the Offing a Southeast Done.

It floweth at Mounts Baye: an East and West Done.

It floweth at Selly: a West and by South Done.

It floweth at the Landes ende of Goulfe: a West South west Done.

It floweth all alongst the coast by to Byssaw, and the coast of Ireland, from Waterford to Kinsale, a west and by South Done.

Furthermore it floweth (for the most parte) from the Poll head of Burdeauz all alongst the coast of Biskay, Calyza, Portingale, till you come to the straightes of Maliga, a Southwest and Southeast Done.

It floweth at Flushing, a Southwest and by South Done.

It

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It floweth at Antwerp : an East and West Moone .
It floweth all alongst the coast of Flaunders , from
the Wildings to Calys, a South and by East Moone: &
so runneth halfe tide vnder the other.

Now here is one speciall thing to be noted, and that
is this : It floweth one point of the Compasse more in
the spring streames, then it doth in anye of the quarters
of the Moone, (so that it bee a Ryuer where there is anye
indraft, hauing distaunce from the Sea) when there is
neyther rage of winde, noz any cause either to hinder or
further the sayd effect.

As for example, thus : It floweth at Grauesende at
the chaunge of the Moone or full , a South Southwest
Moone. But in any of the quarters of the Moone it scant
floweth a South and by West Moone : and this is gene-
rally for euer.

It wyll
flow a
point of
the com-
pas more
in the
springe
tides, than
in the
neap tides
in a riuer
that hath
anye di-
stance vn-
to the sea

The fourth Chapter treateth of the Sunne and
Moones course in the Zodiacke : and how you
shall know what houres the Moone shall rise
and set at : and at what point of the
Compasse : with other nece-
sarie things.

Furthermore, the Sunne (by his naturall moving
through the twelue Signes in the Zodiacke, in the
yeare) doeth cause the height and lownesse of his De-
clination : which is necessarie for the Seafaring men to
knowe, in which Declination they doe take from Equi-
noctiall to Equinoctiall : and this is to bee noted, that
as the Sunne hath declination , so in lyke manner hath
the Moone, for by her declination and the Sun, is knowen
the tyme of her shining or abiding aboue our Horizon .
The Sunne or Moone in the first minute of Aries , doe

To know
how long
the Moone
shineth,

D. iiij.

rise

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rise East, and set West, and shine xij. houres. In the first minute of Taurus, they rise neare the East North-east, and set neare the West North-west, and shine some what more then xiii. houres. In the signe of Gemini: they rise neare the Northeast and by East, and they set neare the North-west and by West, and shine neare xvi. houres. In the signe of Cancer, the first minute: they make their greatest declination to the Northwardes, and they rise neare the Northeast, and set neare the North-west, and shine neare xvi. houres and a halfe. In the first minute of Leo, (descending towarde the Equinotiall,) as they did in Gemini. And in the signe of Virgo, as they did in Taurus. And in the first minute of Libra, Equinotiall: beginning South declination, as in Aries. And in the first minute of Scorpio, they rise neare the East South-east, and sette neare the West South-west, and shine ten houres. In the first minute of Sagittarius, they rise neare the Southeast and by East, and sette neare the South-west and by West, and shine viii. houres. In the first minute of Capricornus, they haue their greatest declination to the South, and begin to returne to the Equinotiall, rising neare the Southeast, and setting neare the South-west, and shine vii. houres and a halfe. In the first minute of Aquarius, as in Sagittarius. In the first minute of Pisces, as in Scorpio. Nowe by this rule you maye

To know
vwhat hou
re or point
the Mone
riseth or
setteeth.

knowe the rising and setting of the Moone for euer: as thus: I haue shewed you befoze in the shifting of the Sunne and Moone, for that euerie daie of the age of the Moone, the Moone goeth Eastwarde one point and three minutes: in two daies two points & sixe minutes, &c. Now when you list to knowe the verie houre and time of her rising: Loke how many dayes the Moone is olde, then put so many points and so many 3. minutes: & loke what it amounteth vnto. But of euer I saie any moze in those matters, here is one speciall thing to be noted, & is, when that

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that the Moone doth chaunge, & then the Moone & the Sun Of the
be both vnder one lyke degree and minute of any signe of chaunge.
the Zodiack. The ful Moone is when the Sunne and the
Moone be opposite (the one being directly against y^e other, Of the ful
& iust 6. signes asunder) as you may perceiue at the full Moone
Moone: for then when the Moone riseth, the Sun setteth: &
when the Sunne riseth the Moone setteth. The quarters Quarter
be, when y^e Sunne & Moone be iust 3. signes asunder (that of the
is, iust 90. degrees.) Now when you list to know y^e verie Moone.
time of the Moones rising or setting, looke in your Kalendar, what signe & degree the Moone is in: then according
to y^e rule of the shining, diuide that into two equal parts,
then frō the South, so shall you see at what houre y^e Moone
riseth, as for example this. In March alwaies the Sunne
is in Aries, then the Moone being in her first quarter, then Ensample
she is 6. houres to the Eastward of the Sunne, then the of the
Moone must needs be in Cancer. Then shineth the Moone Moones
in our Horizon 16. houres and a halfe, then the Moone is rising &
South at 6. of y^e clocke, then she shineth 8 houres & a quar- setting.
ter after 6. of the clocke. So y^e she setteth at ii. of the clocke
& a quarter of an houre past, then she riseth in the day. 8.
houres & a quarter before 6. of y^e clocke, that is, at 9. of the
clocke, & 3. quarters of an houre past. Now at the last quar-
ter in March, then the Moone must needs be in Capricor-
nus, then shineth the Moone but 7. houres & a halfe, then y^e
Moone is South at 6. of the clocke in the morning, then y^e
Moone riseth iii. houres & iii. quarters before, y^e is, at two
of the clocke & a quarter of an houre past in the morning,
then she setteth by day at 9. of the clocke, & 3. quarters of
an houre past, & this rule will serue for euer, without a-
ny great error. But yet there is a further matter for the
exact doing, which is the latitude of the Moone from the
head or taile of the dragon.

And now for to shew vnto you when that the Moone The
is with the head and the taile of the dragon, as I haue in the Moone
hath La-
titude.

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the third Chapter sayde vnto you, there is but few Sea-
men that doeth knowe the Moones Theorax, for that
they cannot tell when that the Moone is in her swift
motion, or slowe motion. So in lyke manner it is neces-
sarie for to knowe the Moones Latitude from the lyne
Eclipticke, and also of which side of the line Eclipticke,
which is knowen from the head or taile of the Dra-
gon. For when that the Moone hath passed nintie de-
grees from the heade of the Dragon, then the Moone hath
Latitude five degrees vnto the North partes of the lyne
Eclipticke, and also if that the Moone be 90. degrees from
the Dragons taile, then the Moone hath Latitude five de-
grees vnto the South partes of the line Eclipticke. So
that the Dragons head is no other thing, but the crossing
or passing of the Moone from the South partes vnto the
North parte of the lyne Eclipticke. So in like manner
the Dragons taile is the crossing or passing of the Moone
ouer the lyne Eclipticke from the North parte vnto the
South partes of the line Eclipticke. The effects of that
is, if that the Moone doeth come with the head or taile of
the Dragon at her opposition or full, that then the Moone
shall be eclipsed, for that then the shadowe of the earth is
scene vpon the Moone, and these eclipses be generall tho-
roue the face of the whole earth, so that the Moone is a-
boue the Horizon. And in like manner, if that the Moone
doeth come wyth the head or taile of the Dragon at the
coniunction or chaunge of the Moone, then the Sunne is
eclipsed, for that the Moone commeth betwene the Sunne
and the earth, but these Eclipses are not generall, for that
the Deameter of the Earth is more then five times
the Deameter of the Moone: and also the Moone commeth
verie nere vnto the earth in respect of the great distance
that the Sunne is from the Earth, so that the Sunne
may be eclipsed in one place but not in another, which
doeth happen by the Moones Paraler, as afoze I haue
shewed

shewed, &c. And now for to knowe where the Dragons head is, note this, when that the Prime is one, then the Dragons head is in the first part of Aries, as the poynt of auge is. But now their motions is contrarve: For as the point of Auge is in Aries, and so commeth into Taurus, and so proceeding thorough the xii. signes in 19. yeares. So the Dragons head doth passe thorough the 12. signes in 19. yeares backwardes, as being in Aries, so it commeth into Pisces, and so into Aquarius, &c. So that in 9. yeares and a halfe, the Dragons head is in Libra, and doth meete with the poynt of Auge, &c.

And now for to knowe the Moones Latitude, marke this, the Prime one, the Dragons heade is in Aries, so that when the Moone is in Cancer, then she is 90. Degrees from the Dragons head, and then the Moone hath her farthest distance from the lyne Eclipticke, that is five Degrees. So that the Moone doth decline five Degrees moze vnto the Northwardes than the Sunne doth. So that the Moone doth decline in all xxviii. Degrees and a halfe from the Equinoctiall, and so when that the Moone doth come towarde the Dragons tayle, which is alwaies opposite vnto the Dragons head, the Prime one, the Dragons tayle is in Lybra. So the Moone passing Cancer, the Moone commeth neerer the Eclipticke. So in Libra, the Moone crosseth the lyne Eclipticke, and then when that she is come into Capricorne, then she is five degrees vnto the Southwardes of the line Eclipticke, and then she declineth 28. Degrees and a halfe vnto the Southwards of the Equinoctiall. So that the Moone doth decline in all, medling not with the Moones Paralex, 57. degrees, the Prime being one, and so in 9. yeares and a halfe, the Dragons head shall be in Libra, and the tayle in Aries, and then the Moone in the signe of Libra, shall passe over the lyne Eclipticke from the South parte to the North part. So that the Moone in the signe of Ca-

E.

pricorne

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pricornie, is five Degrés vnto the North of the lyne Eclipticke, and then she doth decline but xviii. Degrés and a halfe from the Equinotiall to the South partes, and so in the signe of Aries, the Moone shall passe ouer the lyne Eclipticke from the North vnto the South, and the in Cancer, the Moone is five Degrés vnto the South of the lyne Eclipticke, and doth decline xviii. Degrés vnto the North parts of the Equinotiall, so that the Moones whole declination is but 37. Degrés. So when the Prime is one, the declynation of the Moone is moze by xx. Degrés, then when the Prime is betwene nine and tenne yeares, and when the Prime is neare five, then the Dragons head is in Capricornus. And when the Prime is foureteene or fiftene, the Dragons head is in Cancer. So that in xix. yeares the Dragons head doth passe through the twelue signes backwards. And this by knowing what the Prime is, you maye knowe where the Dragons head is, and also the Dragons tayle, and then that knowne, you maye knowe the Moones Latitude from the line Eclipticke, and of which side: For the Moone with the Dragons head, then she passeth ouer from the South vnto the North parte, and the Moone wyth the Dragons tayle, then she passeth ouer from the North vnto the South part of the lyne Eclipticke, and then when that the Moone is halfe way between the head and y^e tayle of the dragon, then the Moone is five Degrés in latitude from the lyne Eclipticke, if that she come frō the head of the Dragon, then on the North side, if from the tayle, then on the South side of the line Eclipticke, & this I doe thinke sufficient for instruction.

Yet there is one thing which I would Sea faring men shoulde consider, although a greate number bee expert in that, yet it is mete to be spoken of, as this. The Sunne being in Cancer, or Moone in lyke manner,

02 in Gemini, 02 anye time when the Sunne 02 Moone hath North declination, they wyl set they Compasse before them, and when they see the Sun give an East shadowe, they will saie that it is five of the clocke, which and if the Sunne be in Cancer, it is not much past five of the clocke, and the more to the Southwardes, the more they doe erre.

You cannot know what a clock it is by the compass, the Sun being in the North signes.

And in lyke case the Moone being in Cancer, when they doe see the Moone give an East shadowe by theyr Compasse, they will saie the Moone is West, but they doe not consider, that the Sunne and the Moone being in Cancer, cometh so neare our Zenith 02 Verticall point right ouer our head, which is y^e verie height of their declination, comming so neare them, therefore they must iudge the East 02 West from the Pole 02 North starre, if they will iudge truely.

Errorr of the shadow of y^e Moone.

Wherefore I doe much commend the Equinoctiall dyalls for the exact truth, for they cannot know the truth by their Compasse, so that the Sunne 02 Moone, 02 anye other starre, haue any great declination, being in Cancer: and you must consider this in lyke manner. The Sunne hauing North declination, the further you doe goe to the Northwardes, the longer is your daye, and the shorter is your night, & towards the Southwardes, the shorter daies and longer nights.

The equinoctiall dyalls be very good

Now contrariwise, the Sunne hauing South declination, the more to the Northwardes, the shorter dayes and the longer nightes, the further to the Southwardes, the longer dayes and shorter nightes, and vnder the Equinoctiall, the nightes and dayes all one, what declination so euer the Sunne hath: but this rule that I haue given you is for London, 02 anye other place that hath that Latitude 02 eleuation of the Pole Articke as 51. 02 52. degrees.

As touching the length & shortnes of the day and night.

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The fifth Chapter is of a Table of declination,
commonly called of Sea-faring men, A Regi-
ment of the Sunne, exactely calculated
for foure yeares, and will serue for
24. yeares, for euery day
of the moneth.



AD in lyke manner as I haue said some
what of the Moones motion, so I doe think
it conuenient for to say somewhat of the
Sunnes motion, for that it is neces-
sarie for Sea-men for to know, the Suns
place in the Zodiacke whereby that they
may calculate or count the Sunnes declination truly, &
as I haue shewed before, that the Sunne dooth passe tho-
rough the Zodiacke in 365. daies. 5. houres 55. minutes.
13. seconds, and hath thre motions as the Moone hath. In
the point of auge is the Sunnes slowe motion, and then
the Sunne passeth or goeth but little more than lvii.
minutes in 24. houres, and in the opposition of auge, the
Sunne passeth or goeth one degree and nere 2. minutes
in 24. houres, that is more by nerer five minutes in her
swift motion than in the Suns slow motion. The point
of auge is now in this age of the worlde in the signe of
Cancer, but not in the Solstitial point, when y the Sun
hath his greatest declination, and also the opposition of
auge is in Capricorne, but not when the Sunne hath his
greatest declination: Now by y meanes of the thre mo-
tions of the Sunne, it raiseth this, that the Equinotiall
poyntes be not euen, for that there is more dayes from
the equinotiall of March vnto the equinotiall of Sep-
tember, by nere nine dayes, then that there is from the
Equi

The Regiment for the Sea.

19.

Equinoctiall of September, vnto the Equinoctiall of March, for that there is from the eleventh daye of March vnto the xiiij. daye of September. 187. dayes, and there is but 178. dayes from the xiiii. daye of September, vnto the xi. daye of March. And the reason is this as I haue sayde befoze, that the latter part of June that the Sunne is in his slowe motion, and also in the latter parte of December, the Sunne is in his swifte motion: and this I doe thinke sufficient for instructions in this matter, for that the Sea-men hath no farther to doe wth the Sunnes motion, but onelye from the true place of the Sunne to seeke the true declination of it. And also the most part of seamen haue vled Spanish Regiments, and thinking that those woulde haue serued for euer, which is most contrarie, for if that it bee neuer so truly calculated, yet it groweth after xxiiii. yeare vnto error. For as often as euerie yeare of Bissextilis doeth come about, which is euerie foure yeare, the Sunne is rather vpon the Equinoctiall by more then halfe an houre, &c.

Nowe shall followe a Table of declination of Regiment for foure yeares, being calculated for Englande, and will serue all Europe wythout much error, or any other Countrie or place that hath our Longitude, as the most parte of Africa, as Ginnie, and those partes to the Southwardes, as farre as the Antarticke Pole, seruing for euery daye of the moneth, verry necessarie for them that doe vse to trauaile eyther by Sea or by lande, and is one of the principall pointes in Nauigation, for long voyages, and the cause why I haue written this Regiment for the Sea, or Tables of Declination, is for that I doe knowe that euerie person that goeth vnto the Sea, as master of a Shippe, hath not capacitie to calculate the Sunnes declination, by the place of the Sunne, although they haue the Tables of Declination, as the

Euery person cannot calculate the Sunnes declination

The Regiment for the Sea.

Ephemerides, of Martin Curteise, otherwyle called the Art of Nauigation. Wherefore I haue written these notes, and Regiment of Table of declination for foure yeares, and the first rowe towards your lefte hand, is the dayes of the moneth: the next rowe is the degrees of declination that the Sun hath at the instant time of none: and the third rowe is the odde minutes of declination belonging to the degrees.

Two
times in
the yeare
the Sun
hath no
declinatio
1577.

Now there be two times in the yeare that the Sunne hath no declination, as this. For the first yeare after Bissextilis, (which was in the yeare of our Lord. 1577. the 11. day of March, at foure of the clocke in the morning) the Sunne was vppon the Equinotiall, beginning North declination. And in like manner the 13. daye of September at none, the Sunne was vppon the Equinotiall beginning South declination, and also the second yeare after Bissextilis, which is the yeare of our Lorde 1578. the Sunne is vpon the Equinotiall the 11. day of March, betwene 10. and 11. of the clocke before none, beginning North declination, and in like manner the 13. day of September, at sixe of the clocke in the after none, beginning South declination.

Furthermore, in the third yeare after Bissextilis, which is the yeare of our Lord 1579. the Sunne is vppon the Equinotiall the 11. day of March, betwene foure and five of the clocke in the after none, beginning North declination, and so in lyke manner the 13. day of September, at 12. of the clocke at midnight, beginning South declination.

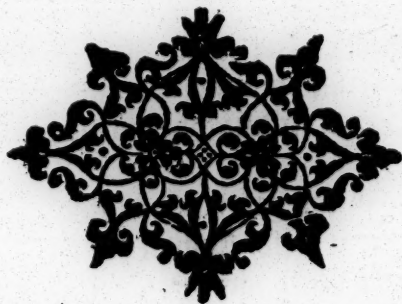
Lastly, in the yeare of our Lorde. 1580. that is, the yeare Bissextilis it selfe. Vppon the 10. day of March, the Sunne shall be vppon the Equinotiall betwene 10. and 11. of the clocke at night, beginning North declination: and in lyke manner the 13. daye of September, at sixe of the clocke in the morning, beginning South declination.

The Regiment for the Sea.

26

declination : *Howe these foure yerres being expired, you must after the yeare Bissextilis, beginne againe at the yeare one : as here doth follow, for example. And so it wil serue for nere 20. yeares to come.*

Yeare 1	Yeare 2	Yeare 3	Yeare Bissextilis
1577	1578	1579	1580
1581	1582	1583	1584
1585	1586	1587	1588
1589	1590	1591	1592
1593	1594	1595	1596



January.			Februarie.			March.		
D.G.M.			D.G.M.			D.G.M.		
1	21	52	1	14	7	1	3	49
2	21	43	2	13	47	2	3	26
3	21	33	3	13	26	3	3	2
4	21	23	4	13	6	4	2	38
5	21	12	5	12	46	5	2	14
6	21	1	6	12	26	6	1	51
7	20	49	7	12	5	7	1	27
8	20	37	8	11	44	8	1	3
9	20	25	9	11	22	9	0	3
10	20	12	10	11	2	10	0	16
11	19	59	11	10	39	11	0	8
12	19	46	12	10	18	12	0	32
13	19	32	13	9	56	13	0	55
14	19	17	14	9	33	14	1	19
15	19	3	15	9	11	15	1	42
16	18	47	16	8	49	16	2	6
17	18	32	17	8	26	17	2	29
18	18	17	18	8	4	18	2	53
19	18	1	19	7	41	19	3	17
20	17	45	20	7	19	20	3	40
21	17	28	21	6	56	21	4	3
22	17	11	22	6	33	22	4	26
23	16	54	23	6	10	23	4	49
24	16	37	24	5	46	24	5	12
25	16	19	25	5	23	25	5	35
26	16	1	26	5	0	26	5	58
27	15	42	27	4	36	27	6	21
28	15	23	28	4	13	28	6	44
29	15	5				29	7	6
30	14	46				30	7	28
31	14	26				31	7	0

South declination.

Equino-
Sol.
ctial.

North declination.

South declination.

F.

Aprill.

1577 THE FIRST YEARE.

April.			May.			June.		
D.G.M.			D.G.M.			D.G.M.		
1	8	13	1	17	49	1	23	8
2	8	35	2	18	5	2	23	12
3	8	57	3	18	20	3	23	15
4	9	19	4	18	35	4	23	18
5	9	41	5	18	49	5	23	22
6	10	2	6	19	4	6	23	24
7	10	23	7	19	17	7	23	26
8	10	44	8	19	31	8	23	27
9	11	6	9	19	44	9	23	27
10	11	25	10	19	57	10	23	28
11	11	45	11	20	8	11	23	28
12	12	6	12	20	21	12	23	28
13	12	26	13	20	33	13	23	28
14	12	4	14	20	45	14	23	27
15	13	6	15	20	56	15	23	26
16	13	26	16	21	6	16	23	25
17	13	45	17	21	17	17	23	24
18	14	4	18	21	27	18	23	22
19	14	23	19	21	37	19	23	19
20	14	41	20	21	46	20	23	15
21	15	0	21	21	55	21	23	12
22	15	18	22	22	3	22	23	8
23	15	35	23	22	12	23	23	3
24	15	53	24	22	19	24	22	59
25	16	11	25	22	27	25	22	54
26	16	29	26	22	33	26	22	48
27	16	45	27	22	40	27	22	42
28	17	2	28	22	47	28	22	35
29	17	18	29	22	52	29	22	29
30	17	34	30	22	57	30	22	22
			31	23	3			

North declination.

Solstic.

North declination.

July.

July.			August.			September.		
D.G.M.			D.G.M.			D.G.M.		
1	22	13	1	15	23	1	4	39
2	22	5	2	15	5	2	4	16
3	21	56	3	14	48	3	3	53
4	21	47	4	14	30	4	3	31
5	21	36	5	14	11	5	3	7
6	21	27	6	13	51	6	2	44
7	21	19	7	13	33	7	2	20
8	21	8	8	13	13	8	1	58
9	20	57	9	12	54	9	1	34
10	20	47	10	12	34	10	1	10
11	20	35	11	12	14	11	0	48
12	20	24	12	11	53	12	0	24
13	20	12	13	11	33	13	0	0
14	19	59	14	11	14	14	0	24
15	19	46	15	0	54	15	0	47
16	19	33	16	15	32	16	1	11
17	19	19	17	10	12	17	1	34
18	19	5	18	9	0	18	1	58
19	18	56	19	9	21	19	2	21
20	18	37	20	9	7	20	2	44
21	18	22	21	8	46	21	3	8
22	18	9	22	8	24	22	3	32
23	17	53	23	8	2	23	3	55
24	17	37	24	7	39	24	4	18
25	17	22	25	7	18	25	4	41
26	17	5	26	6	55	26	5	3
27	16	49	27	6	33	27	5	27
28	16	22	28	6	15	28	5	50
29	16	7	29	5	47	29	6	13
30	15	59	30	5	25	30	6	36
31	15	41	31	5	2			

North declination.

Equino.

Sol.

ctiall.

South declination.

North declination.

Fri.

October.

1577 THE FIRST YEARE.

October.			November.			December.		
D.G.M.			D.G.M.			D.G.M.		
1	6	59	1	17	26	1	23	3
2	7	22	2	17	43	2	23	8
3	7	44	3	17	59	3	23	12
4	8	6	4	18	15	4	23	15
5	8	39	5	18	31	5	23	19
6	8	51	6	18	46	6	23	22
7	9	13	7	19	1	7	23	24
8	9	34	8	19	16	8	23	25
9	9	56	9	19	30	9	23	26
10	10	18	10	19	44	10	23	27
11	10	40	11	19	58	11	23	28
12	11	1	12	20	10	12	23	28
13	11	23	13	20	22	13	23	28
14	11	44	14	20	36	14	23	27
15	12	5	15	20	48	15	23	26
16	12	26	16	20	59	16	23	25
17	12	47	17	21	10	17	23	24
18	13	7	18	21	21	18	23	21
19	13	27	19	21	33	19	23	18
20	13	47	20	21	41	20	23	14
21	14	7	21	21	51	21	23	11
22	14	26	22	21	59	22	23	6
23	14	45	23	22	8	23	23	1
24	15	4	24	22	17	24	22	52
25	15	23	25	22	25	25	22	50
26	15	41	26	22	32	26	22	43
27	16	0	27	22	39	27	22	36
28	16	17	28	22	46	28	22	28
29	16	35	29	22	52	29	22	21
30	16	52	30	22	57	30	22	13
31	17	9				31	22	4

South declination.

South declination.

Solstic.

January.

1578. THE SECOND YEARE. 23

January.			February.			March.		
D.G.M.			D.G.M.			D.G.M.		
1	21	56	1	14	12	1	3	55
2	21	46	2	13	52	2	3	32
3	21	36	3	13	32	3	3	8
4	21	26	4	13	11	4	2	44
5	21	15	5	12	51	5	2	20
6	21	4	6	12	31	6	1	57
7	20	52	7	12	10	7	1	34
8	20	41	8	11	49	8	1	10
9	20	28	9	11	27	9	0	46
10	20	16	10	11	6	10	0	22
11	20	3	11	10	44	11	0	2
12	19	49	12	10	23	12	0	25
13	19	36	13	10	1	13	0	49
14	19	21	14	9	39	14	1	13
15	19	7	15	9	17	15	1	36
16	18	52	16	8	55	16	2	0
17	18	37	17	8	32	17	2	23
18	18	17	18	8	10	18	2	47
19	18	1	19	7	47	19	3	11
20	17	49	20	7	25	20	3	34
21	17	32	21	7	2	21	3	56
22	17	15	22	6	39	22	4	20
23	16	57	23	6	16	23	4	43
24	16	40	24	5	52	24	5	7
25	16	23	25	5	29	25	5	29
26	16	5	26	5	6	26	5	52
27	15	47	27	4	42	27	6	16
28	15	28	28	4	19	28	6	38
29	15	10				29	7	1
30	14	51				30	7	23
31	14	31				31	7	49

South declination.

South declination.



North declination.

F.iii.

April.

1578. THE SECOND YEARE.

April.

May.

June.

D. G. M.

D. G. M.

D. G. M.

1	8	9
2	8	30
3	8	51
4	9	14
5	9	35
6	9	56
7	10	18
8	10	39
9	10	59
10	11	20
11	11	41
12	12	1
13	12	21
14	12	41
15	13	1
16	13	21
17	13	40
18	14	0
19	14	18
20	14	37
21	14	55
22	15	13
23	15	30
24	15	48
25	16	6
26	16	23
27	16	40
28	16	57
29	17	13
30	17	30

North declination.

1	17	46
2	18	1
3	18	17
4	18	32
5	18	46
6	19	1
7	19	14
8	19	28
9	19	41
10	19	54
11	20	6
12	20	18
13	20	30
14	20	41
15	20	53
16	21	3
17	21	14
18	21	25
19	21	34
20	21	43
21	21	52
22	22	1
23	22	9
24	22	17
25	22	25
26	22	31
27	22	38
28	22	45
29	22	52
30	22	58
31	23	1

North declination.

Solstic.

1	23	6
2	23	11
3	23	14
4	23	17
5	23	20
6	23	23
7	23	25
8	23	26
9	23	27
10	23	27
11	23	28
12	23	28
13	23	28
14	23	27
15	23	26
16	23	25
17	23	24
18	23	22
19	23	20
20	23	16
21	23	12
22	23	9
23	23	5
24	23	0
25	22	54
26	22	49
27	22	43
28	22	36
29	22	29
30	22	22

July.

July.			August.			September.		
D.G.M.			D.G.M.			D.G.M.		
1	22	14	1	15	28	1	4	45
2	22	6	2	15	10	2	4	22
3	21	58	3	14	51	3	3	58
4	21	49	4	14	33	4	3	36
5	21	40	5	14	16	5	3	13
6	21	31	6	13	58	6	2	49
7	21	21	7	13	38	7	2	26
8	21	11	8	13	18	8	2	4
9	21	0	9	12	58	9	1	42
10	20	49	10	12	39	10	1	18
11	20	38	11	12	19	11	0	56
12	20	26	12	11	59	12	0	32
13	20	13	13	11	39	13	0	7
14	20	2	14	11	19	14	0	17
15	19	55	15	10	58	15	0	41
16	19	37	16	10	36	16	1	3
17	19	23	17	10	16	17	1	27
18	19	9	18	9	54	18	1	51
19	18	55	19	9	34	19	2	15
20	18	42	20	9	12	20	2	38
21	18	26	21	8	50	21	3	1
22	18	12	22	8	28	22	3	24
23	17	56	23	8	7	23	3	48
24	17	41	24	7	45	24	4	11
25	17	25	25	7	24	25	4	34
26	17	9	26	7	2	26	4	57
27	16	52	27	6	39	27	5	20
28	16	36	28	6	16	28	5	44
29	16	20	29	5	53	29	6	7
30	16	2	30	5	31	30	6	30
31	15	45	31	5	8			

North declination.

North declination.



South declination.

F.iiiij.

October.

1578. THE SECOND YEARE.

October.

November.

December.

D. G. M.

D. G. M.

D. G. M.

1	6	53
2	7	16
3	7	39
4	8	0
5	8	23
6	8	45
7	9	8
8	9	30
9	9	52
10	10	13
11	10	35
12	10	56
13	11	18
14	11	39
15	12	0
16	12	21
17	12	42
18	13	2
19	13	22
20	13	42
21	14	2
22	14	22
23	14	41
24	15	0
25	15	19
26	15	37
27	15	56
28	16	14
29	16	31
30	16	48
31	17	5

South declination.

1	17	22
2	17	39
3	17	55
4	18	1
5	18	27
6	18	42
7	18	57
8	19	11
9	19	25
10	19	39
11	19	53
12	20	6
13	20	19
14	20	32
15	20	44
16	20	56
17	21	6
18	21	17
19	21	28
20	21	38
21	21	48
22	21	57
23	22	6
24	22	15
25	22	23
26	22	31
27	22	37
28	22	44
29	22	51
30	22	57

Solstic.

South declination.

1	23	2
2	23	7
3	23	12
4	23	15
5	23	18
6	23	22
7	23	25
8	23	26
9	23	26
10	23	27
11	23	28
12	23	28
13	23	28
14	23	27
15	23	26
16	23	25
17	23	24
18	23	22
19	23	19
20	23	15
21	23	12
22	23	8
23	23	2
24	22	56
25	22	51
26	22	45
27	22	37
28	22	30
29	22	23
30	22	15
31	22	7

January.

January.			February.			March.				
D.G.M.			D.G.M.			D.G.M.				
1	21	57	South declination.	1	14	17	South declination.	1	4	2
2	21	48		2	13	57		2	3	38
3	21	38		3	13	37		3	3	15
4	21	28		4	13	15		4	2	51
5	21	18		5	12	56		5	2	27
6	21	6		6	12	35		6	2	3
7	20	55		7	12	15		7	1	40
8	20	44		8	11	54		8	1	16
9	20	31		9	11	33		9	0	52
10	20	19		10	11	12		10	0	28
11	20	5		11	10	51		11	0	4
12	19	52		12	10	29		12	0	20
13	19	39		13	10	7		13	0	44
14	19	24		14	9	45		14	1	8
15	19	10		15	9	22		15	1	32
16	18	56		16	9	0		16	1	55
17	18	40		17	8	38		17	2	18
18	18	24		18	8	15		18	2	41
19	18	9		19	7	53		19	3	5
20	17	53		20	7	30		20	3	29
21	17	36		21	7	8		21	3	52
22	17	20		22	6	45		22	4	14
23	17	2		23	6	22		23	4	38
24	16	45		24	5	59		24	5	1
25	16	27		25	5	35		25	5	24
26	16	10		26	5	12		26	5	47
27	15	51		27	4	49		27	6	10
28	15	33		28	4	25		28	6	33
29	15	13						29	6	56
30	14	55						30	7	19
31	14	35						31	7	40

G.

April.

South declination.

Equino-

Sol.

ctial.

North declination.

G.

Aprill.

1579 THE THIRD YEAR.

April.			May.			June.		
D.G.M.			D.G.M.			D.G.M.		
1	8	1	1	17	43	1	23	5
2	8	24	2	17	59	2	23	10
3	8	46	3	18	14	3	23	13
4	9	8	4	18	28	4	23	16
5	9	30	5	18	42	5	23	20
6	9	52	6	18	57	6	23	23
7	10	12	7	19	11	7	23	24
8	10	34	8	19	24	8	23	25
9	10	57	9	19	38	9	23	26
10	11	16	10	19	51	10	23	27
11	11	36	11	20	3	11	23	28
12	11	56	12	20	15	12	23	28
13	12	17	13	20	28	13	23	28
14	12	37	14	20	39	14	23	27
15	12	57	15	20	51	15	23	26
16	13	16	16	21	1	16	23	25
17	13	35	17	21	12	17	23	24
18	13	54	18	21	22	18	23	22
19	14	14	19	21	32	19	23	20
20	14	32	20	21	42	20	23	17
21	14	51	21	21	51	21	23	13
22	15	10	22	22	0	22	23	10
23	15	27	23	22	8	23	23	6
24	15	46	24	22	16	24	23	1
25	16	4	25	22	24	25	22	55
26	16	22	26	22	30	26	22	50
27	16	38	27	22	37	27	22	44
28	16	54	28	22	43	28	22	37
29	17	10	29	22	50	29	22	31
30	17	27	30	22	55	30	22	24
			31	23	0			

North declination.

Solstic.
North declination.

July.

July.			August.			September.		
D.G.M.			D.G.M.			D.G.M.		
1	22	16	1	15	30	1	4	54
2	22	9	2	15	13	2	4	23
3	22	0	3	14	56	3	4	5
4	21	51	4	14	49	4	3	41
5	21	43	5	14	20	5	3	18
6	21	33	6	14	1	6	2	55
7	21	23	7	13	42	7	2	31
8	21	12	8	13	22	8	2	8
9	21	2	9	13	3	9	1	47
10	20	52	10	12	43	10	1	23
11	20	42	11	12	23	11	0	59
12	20	30	12	12	2	12	0	36
13	20	18	13	11	42	13	0	12
14	20	6	14	11	23	14	0	12
15	19	57	15	11	2	15	0	36
16	19	40	16	10	41	16	0	59
17	19	26	17	10	20	17	1	23
18	19	13	18	9	53	18	1	47
19	19	0	19	9	38	19	2	10
20	18	45	20	9	17	20	2	33
21	18	30	21	8	56	21	2	56
22	18	15	22	8	33	22	3	20
23	18	0	23	8	12	23	3	43
24	17	45	24	7	50	24	4	6
25	17	29	25	7	28	25	4	30
26	17	14	26	7	5	26	4	52
27	16	57	27	6	43	27	5	16
28	16	40	28	6	20	28	5	39
29	16	24	29	5	53	29	6	2
30	16	6	30	5	35	30	6	25
31	15	49	31	5	14			

North declination.

Equino.

Sol.

Etiall.

South declination.

G.ii.

October.

1579 THE THIRD YEARE.

October.			November.			December.		
D.G.M.			D.G.M.			D.G.M.		
1	6	48	1	17	16	1	23	0
2	7	10	2	17	33	2	23	6
3	7	34	3	17	49	3	23	11
4	7	55	4	18	5	4	23	15
5	8	18	5	18	22	5	23	18
6	8	40	6	18	37	6	23	21
7	9	3	7	18	52	7	23	24
8	9	25	8	19	7	8	23	26
9	9	46	9	19	21	9	23	27
10	10	8	10	19	35	10	23	27
11	10	30	11	19	49	11	23	28
12	10	53	12	20	2	12	23	28
13	11	13	13	20	15	13	23	28
14	11	33	14	20	28	14	23	27
15	11	54	15	20	40	15	23	27
16	12	15	16	20	53	16	23	26
17	12	34	17	21	4	17	23	25
18	12	56	18	21	15	18	23	23
19	13	16	19	21	26	19	23	21
20	13	36	20	21	36	20	23	16
21	13	56	21	21	45	21	23	12
22	14	16	22	21	54	22	23	8
23	14	35	23	22	3	23	23	3
24	14	57	24	22	12	24	22	57
25	15	12	25	22	20	25	22	52
26	15	30	26	22	28	26	22	46
27	15	49	27	22	35	27	22	39
28	16	7	28	22	42	28	22	32
29	16	25	29	22	49	29	22	25
30	16	42	30	22	55	30	22	17
31	16	59				31	22	8

South declination.

Solstic.

South declination.

January.

1580. THE YEARE BISSEXTILIS. 27

Ianuary.			Februarie.			March.		
D.G.M.			D.G.M.			D.G.M.		
1	21	59	1	14	21	1	3	44
2	21	50	2	14	2	2	3	21
3	21	41	3	13	42	3	2	57
4	21	31	4	13	22	4	2	33
5	21	20	5	13	2	5	2	9
6	21	9	6	12	41	6	1	46
7	20	58	7	12	21	7	1	22
8	20	47	8	12	0	8	0	58
9	20	34	9	11	39	9	0	34
10	20	22	10	11	18	10	0	10
11	20	9	11	10	57	11	0	14
12	19	56	12	10	35	12	0	38
13	19	43	13	10	13	13	1	0
14	19	28	14	9	51	14	1	24
15	19	13	15	9	28	15	1	48
16	18	59	16	9	6	16	2	12
17	18	44	17	8	44	17	2	35
18	18	29	18	8	21	18	2	59
19	18	14	19	7	59	19	3	22
20	17	57	20	7	36	20	3	46
21	17	41	21	7	14	21	4	9
22	17	25	22	6	51	22	4	32
23	17	7	23	6	28	23	4	55
24	16	50	24	6	5	24	5	19
25	16	32	25	5	41	25	5	41
26	16	14	26	5	18	26	6	3
27	15	56	27	4	55	27	6	27
28	15	38	28	4	3	28	6	50
29	15	18	29	4	8	29	7	13
30	15	0				30	7	53
31	14	41				31	7	57

South declination.

South declination.

Equino.



Equino.

North declination.

G.ij.

April.

1580. THE YEARE BISSEXTILIS.

Aprill.			May.			Iune.				
D. G. M.			D. G. M.			D. G. M.				
1	8	20	North declination.	1	17	54	North declination.	1	23	8
2	8	41		2	18	9		2	23	12
3	9	3		3	18	24		3	23	15
4	9	25		4	18	38		4	23	19
5	9	46		5	18	53		5	23	22
6	10	8		6	19	7		6	23	24
7	10	29		7	19	21		7	23	25
8	10	50		8	19	34		8	23	26
9	11	11		9	19	48		9	23	27
10	11	31		10	20	0		10	23	28
11	11	51		11	20	12		11	23	28
12	12	12		12	20	25		12	23	28
13	12	33		13	20	37		13	23	27
14	12	52		14	20	48		14	23	27
15	13	12		15	20	58		15	23	26
16	13	32		16	21	9		16	23	25
17	13	51		17	21	20	17	23	24	
18	14	11		18	21	30	18	23	21	
19	14	29		19	21	39	19	23	18	
20	14	47		20	21	48	20	23	14	
21	15	5		21	21	57	21	23	11	
22	15	24		22	22	5	22	23	7	
23	15	41		23	22	14	23	23	2	
24	16	0		24	22	23	24	22	56	
25	16	18		25	22	29	25	22	51	
26	16	34		26	22	35	26	22	46	
27	16	50		27	22	41	27	22	39	
28	17	6		28	22	48	28	22	32	
29	17	22		29	22	56	29	22	26	
30	17	39		30	22	58	30	22	18	
			31	23	3					

July.

1580. THE YEARE BISSEXTILIS. 28

Iuly.			August.			September.		
D.G.M.			D.G.M.			D.G.M.		
1	22	10	1	15	17	1	4	33
2	22	2	2	15	0	2	4	10
3	21	53	3	14	42	3	3	47
4	21	45	4	14	23	4	3	24
5	21	36	5	14	5	5	3	0
6	21	26	6	13	46	6	2	37
7	21	16	7	13	26	7	2	13
8	21	6	8	13	7	8	1	52
9	20	55	9	12	48	9	1	28
10	20	44	10	12	28	10	1	4
11	20	32	11	12	8	11	0	41
12	20	21	12	11	47	12	0	18
13	20	9	13	11	28	13	0	6
14	19	56	14	11	7	14	0	30
15	19	43	15	10	46	15	0	35
16	19	30	16	10	26	16	1	17
17	19	16	17	10	4	17	1	40
18	19	2	18	9	43	18	2	4
19	18	48	19	9	21	19	2	26
20	18	34	20	8	59	20	2	50
21	18	19	21	8	37	21	3	13
22	18	4	22	8	16	22	3	37
23	17	48	23	7	56	23	4	0
24	17	33	24	7	33	24	4	23
25	17	19	25	7	11	25	4	46
26	17	2	26	6	49	26	5	9
27	16	45	27	6	26	27	5	32
28	16	28	28	6	3	28	5	55
29	16	11	29	5	40	29	6	19
30	15	53	30	5	19	30	6	42
31	15	36	31	4	57			

North declination.

North declination.



Equino-
ctiall.

South declination.

G.iiij.

October.

1580. THE YEARE BISSEXTILIS.

October.			November.			December.		
D. G. M.			D. G. M.			D. G. M.		
1	7	5	1	17	31	1	23	5
2	7	27	2	17	47	2	23	10
3	7	49	3	18	3	3	23	13
4	8	12	4	18	19	4	23	16
5	8	34	5	18	34	5	23	20
6	8	56	6	18	49	6	23	23
7	9	18	7	19	4	7	23	25
8	9	46	8	19	18	8	23	26
9	10	2	9	19	32	9	23	27
10	10	24	10	19	46	10	23	27
11	10	45	11	20	0	11	23	28
12	11	7	12	20	13	12	23	28
13	11	28	13	20	26	13	23	28
14	11	49	14	20	37	14	23	27
15	12	10	15	20	50	15	23	26
16	12	31	16	21	1	16	23	25
17	12	51	17	21	12	17	23	24
18	13	11	18	21	23	18	23	21
19	13	31	19	21	33	19	23	18
20	13	51	20	21	43	20	23	13
21	14	11	21	21	52	21	23	9
22	14	30	22	22	1	22	23	6
23	14	59	23	22	11	23	23	0
24	15	9	24	22	19	24	22	54
25	15	27	25	22	27	25	22	49
26	15	46	26	22	34	26	22	43
27	16	4	27	22	41	27	22	35
28	16	22	28	22	48	28	22	28
29	16	39	29	22	54	29	22	21
30	16	56	30	22	59	30	22	13
31	17	14				31	22	4

South declination.

Solstic.

South declination.

The Regiment for the Sea.

The first Chapter sheweth how to take the height of the Sunne with the Crosse staffe, or with the Astrolobe, and also how to finde the true Meridian, with other necessarie matters.



To take the true height of the Sunne at the Sea, the best way is, to do it with the Crosse staffe, for that the Sea is moueable, and causeth the ship to heaue and set little or much. And also vpon the Crosse staffe the degrees be larger marked than the Ring or Astrolobe: and in a large instrument, an error is seene sooner and better, than it is in a small instrument.

Now to take the height of the Sunne, to knowe the Altitude of the Pole about the Horizon, do this: First set the Sunne with a Compasse to know when that the Sunne cometh nere vnto the Meridian: as soon as you see that the Sunne is come vnto the South and by East, then begin to take the height of the Sunne with the Crosse staffe, in this manner: Put the Transuallory vpon the long staffe, then set the ende of the long staffe close at the corner of your eye, winking with your other eye, and remouing the Transuallory forwarde or backward, untill you do see the lower ende of it (being iust with the Horizon) and the vpper ende of it, (being iust with the middle of the Sunne) both to agree with the Sunne and the Horizon at one time: and so haue you the true height of the Sunne. This done, stil obserue the same, untill you see the Sun at the highest, & beginning to decrease, and then haue you finished. Yet notwithstanding this is to be noted, that it is best to take the height of the Sunne with the Crosse staffe, when the Sunne is

How to
obserue
the Sun.

To take
the height
of the Sun
with the
Crosse
staffe.

The cause
why the
Crosse
staffe is

under

The Regiment for the Sea.

best to
take the
height of
the Sun
vnder 50.
degrees.

vnder fiftie degrees in height aboue the Horizon, for two causes. The one is this: Till the Sunne be fiftie Degrees in height, the degrees be largely marked vpon the Crosse staffe, but after (the Sunne being aboue 50. degrees high) they be lesser marked then the other is, for that the Sunne being vnder 50. degrees in height, you may easily take the height, because you may easely see or viewe the vpper ende and the nether ende of the Crosse staffe both at one time: but if it doth exteende 50. degrees, then by the meanes of casting your eye vpwordes and downewards so much, you may soone commit error, and then in like manner, the degrees be so small marked, that if the Sunne doth passe 50. or 60. degrees in height, you must leaue the Crosse staffe, and vse the marriners ring, called by them the Astrolaby or Astrolobe.

To take
the height
of the sun
with the
astrolobe.
How to
correcte
your A-
strolobe if
it dooth
not hang
vp right.

Now to take the height of the Sunne with the common Ring or Astrolobe, doe thus: The Sunne being (as before is declared) nere the Meridian or South, obserue it (vntill you haue the greatest height thereof) in this manner: Holde the Ring of the Astrolobe vpon one of your fingers, and turne the Atheliday vp & down, vntill you see the shadow of the Sunne pearce or passe through both the sights therof, being sure that the Astrolobe doth hang vp right, which you maye proue in this manner.

Looke at how many degrees and minutes the Atheliday doth stande vpon the Astrolobe, then tourne the Atheliday vnto the same number of the degrees and minutes on the other side of the Astrolobe, and then taking the height of the Sunne againe, if it doe agree as it dyd before, then the Astrolobe doth hang vp right: but if it do not, then it doth not hang vp right. For knowledge of the true height of the Sunne (the Astrolobe not hanging vp right) doe thus: if the Astrolobe be truely marked, marke the diuersitie, that being knowen, rebate from the

the grettest height half the diuersitie, or els adde vnto the lesser height halfe the diuersitie, & that shall be the true height of the Sunne, although that the Astrolobe dooth not hang vpright.

The Astrolobe is best to take the height of the Sun, if the Sunne be very high, at 60, 70, or 80 degrees: and the cause is this: The Sunne comming nere vnto your Zenith, hath great power of light, so to pearce the two sights of the Athelidag of the Astrolobe, and then it is not good to vse the Crosse stasse, so that the Sunne hurteth the eyes of a man, and besides that, it is too hygh to occupy the Crosse stasse, (as before is declared) so that this way you may very much preserve your eyes. If you haue not glasses vpon your stasse (to saue your eyes in taking the height of the Sunne) but be vnprouided of them, do thus: take and couer the Sunne, with the ende of the Transuastorie of the Crosse stasse, vnto the very vpper edge or brinke of the Sunne, (so shal you not neede to beholde the brightnesse of it) and with the other ende of the Transuastorie to take the Horizon truly, and that being done, so that the Sunne is 30, or 31. minutes in Diameter or breadth, therefore you shall rebate xv. minutes from the Altitude or heighth of the Sunne, and then that which shall remayne, shall be the true heighth of the Sunne, from the Centre or middle of the Sunne. And furthermore, there is some errour in the taking the Sunne or Starre with the Ballastell or Crosse stasse, and that groweth by this meanes: so that the true centre (which is the sight of the eye) is within, in the middle of the eye, and not in the outside of the eye: so that the ende of the long stasse in the setting of it vnto the corner of your eye, doth stande somewhat further out than the sight of your eye, that is to say, that the sight of the eye is somewhat further into the head, than the ende of the stasse doth come: wherefore you

The Astrolobe is best to take the height of the Sunne at 60, 70, or 80. degrees in height.

How to preserve your eyes vvhē you touch the Sun vwith the crosse stasse, and haue no glasses. The Diameter of the Sun is 30. or 31. minutes.

Some error in the crosse stasse & how to reforme it

The Regiment for the Sea.

To gette
the true
Meridian
vpon the
lande.

must pare away a little of the end of the staffe, for some mens eyes more, and some mens eyes lesse, for that it is according as you maye set the staffe vnto your eye, for some men neede pare away little or nothing, and some men must pare away 14. or 15. minutes; as you may set the staffe, because some mens eyes be further into theyr head, than other some mens are, and the bones of some mens face stand further out than other some do. It is moreouer conuenient to knowe y^e true Meridian or south, which you must do either with a good compasse, or with a perfect Diall or Needle: but if you be on the land, this you may do, on a peece of timber or any other thing that standeth fast, with a paire of Compasses make a Circle, then in the middle or center where the foote of the Compasse did stand, set a wiew vpright (as circumspectlye as you can) and then you may do this: looke in the morning (so it be on playne ground: that you may see the Horizon Circle, without any let at the Sunne rising, for the shadow of the wiew) and there set a prick: then at the setting of y^e Sun you shall set another prick, euen at the circumference of the Circle, then denide that with your Compasses euen in two peeces, and strike a straight lyne from the wiew or center of the circle, to the middle or deuided prick, and that shall be the true Meridian. Or else (the wiew standing vpright) first in the forenoone when the toppe of the wiew doth touch, or is readie to come into the circumference or edge of the Circle, there make a prick: then in the afternoone in lyke manner, at the very coming out or touching of the wiew, of the edge of the Circle, there make an other prick euen with the coming out of the shadowe: this done (as circumspectlye as you can) denide these two prickes in the middle, than as before is said, drawe a lyne from the center or wiew to the middle prick, and that shadowe shall be your true Meridian. After an other maner

The Regiment for the Sea.

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her you may doe this: looke and watch when the wyze giueth the shortest shadow, and there make a pricke, then drawe a line from that pricke to the wyze, which shadow shall be the true Meridian.

And yet furthermoze, for that it is most conuenient to knowe the true Meridian at the Sea, because in long voyages, going farre vnto the Westward or Eastward, the compasse doth varie: to finde the true Meridian, doe this. Set the Sunne with your compasse at her rising or appearing aboue the Horizon, and then (knowing what point and parte the Sunne doth rise at) set the Sunne wyth your compasse at her setting or departing vnder the Horizon, and (that being knowen) you shall perfectly knowe whether the compasse bee varied, and howe much: for ensample this, I doe set the Sunne at her rising wyth the compasse, and she doth rise vppon the East point: in lyke manner also I doe set the Sunne wyth the compasse at her setting, and doe finde her to set West Northwest: so I doe see the compasse to bee varied one point, that is to saie, the North point doth stande North and by East, &c. And furthermoze (for that seldome times the Sunne doth rise and set cleere by the meanes of the cloudes, and other impedimentes nere the Horizon) you may get the true Meridian thus: at any time in the forenoone, first set the Sunne with your compasse, and then take the true height of the Sunne. Nowe you (knowing howe many degrees the Sunne was highe at that point of the Compasse) you maye in lyke manner obserue the Sunne in the afternoone, vntill you doe finde the Sunne iust at that height that it was in the forenoone, marking at what point of the compasse the Sunne is, and so shall you see perfectly whether the compasse bee varied or no, and also how much: for ensample thus: I take the Sunne vppon the Southeast point. 20. degrees aboue the Horizon, and then in the afternoone I doe obserue the Sunne

To know
the true
Meridian
at the sea,
and also
if your
compasse
be varied
and to
knowe
howe
much
the bee
varied.

V.ij.

vntill

The Regiment for the Sea.

untill such time as I do finde the Sunne iust 20. degrees
aboue the Horizon againe, and then I set the Sun wyth
the compasse, and do finde the Sunne to be at 20. degrees
in height West Southwest, so that I see the compasse to
be varied one point, that is to saie, the North point doth
stand North and by East, &c.

To finde
the varia-
tio of the
compasse
in the
night, by
the stars,
but not
by the
Moone.

Another way also to knowe the true Meridian by the
Sunne : that is, to sette the Sunne with the compasse at
her greatest height aboue the Horizon, and so you shall
knowe whether the compasse be varied, and how much:
and loke what is spoken of the Sunne by daie, you may
doe the like by night by anye of the starres that you per-
fectly doe knowe, doing as you doe by the Sunne in all
pointes : but you cannot doe it so well and truely by the
Moone, by the meanes of the swiftnesse of the Moones
motion in the Zodiacke, you may also finde the varia-
tion of the Compasse by the North Starre, as thus : sette
the North Starre with the compasse, if the North point
doe stand right wyth the Starre, then it is not varied,
but if it doth not stande right wyth the Starre, then it is
varied : and that must be done when the two Starres
of Charles wayne called the pointers, be right vnder or
right ouer the North Starre, but if that the Starres be
West from the North Starre, then the North Starre is the
third parte of a point vnto the Eastwarde of the North
Pole. If the two Starres of Charles Wayne, called the
pointers, be due East from the North star, then the North
starre, is the third part of a point vnto the Westward of
the North Pole, &c.

Meddel
not wyth
your com-
passe, al-

This haue I sayd, because that sometime in sandie
places, the compasse doth varie, and especially in the say-
lyng of long voyages, running East and West, (called
the Northeasting or Northweasting of the Compasse)
therefore I woulde not withe them to meddle with the
wending of their compasse, or whetting of the side of the
needle,

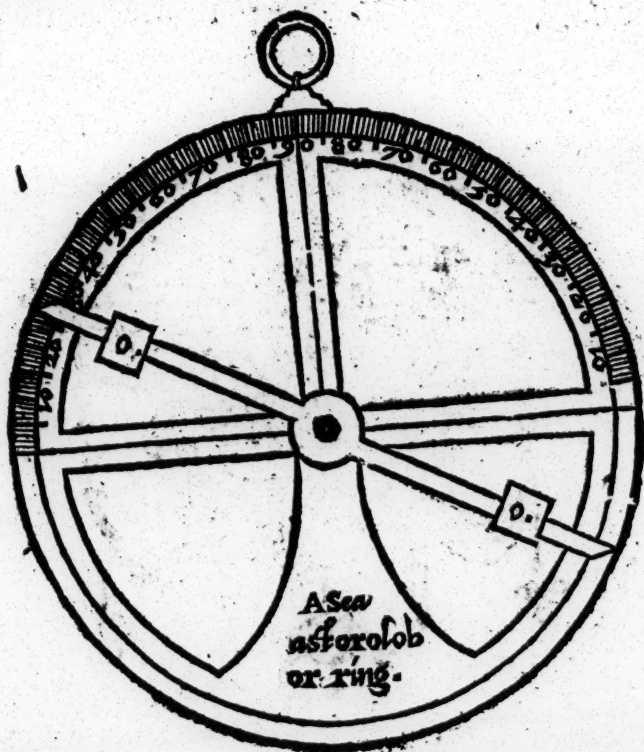
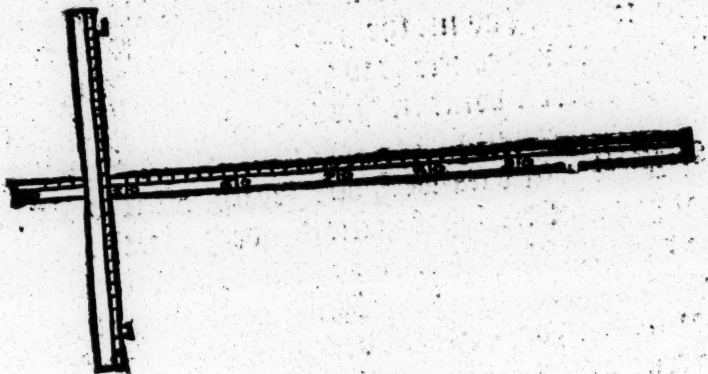
The Regiment for the Sea.

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needle, to the end to make it stande due North, but circumspectly to awaite the altering of the Compasse, and what quantitie it doth alter: as you may doe verie well by the order before rehearsed, and then let your Compasse alone: for although that it doth varie two or three pointes, you may make account according to the variation, as thus, I admit the Northwest point standeth due North, and my course is to goe due West, I will occupie the Southwest point in this case for the West point. And thus (by obseruation and trying of my Compasse) I care not what pointe standeth due North, for it is all one, so that you consider what point standeth North. And also there is deuised by one Norman a Compasse maker, a verie necessarie deuice in a Compasse, that you may set the North point, vppon what degree you list, according vnto the true variation of the Compasse, at all times at your pleasure.



The Regiment for the Sea.
The Bella Stella, or Crosse
staffe: to take the height of the Sunne
or Starre.



The vii. Chapter sheweth how to handle the declination of the Sunne to knowe the altitude of the North Pole about the Horizon, (the height of the Sunne being truly taken and knowen in any place betwene the North Pole and the Equinoctiall) so that the Sunne be vnto the Southwardes of you, at the taking of the Sunne vpon the Meridian.

You must consider by the Regiment or table of declination (going before) that the 1. day of March the Sunne is Equinoctiall, entering then the first point of Aries, (called the Equinoctiall of spring time, where he hath no declination. The 10. day of April, the Sun entereth into the first minute of Taurus, then hauing declination to the Southwardes 10 degrees 30 minutes. The 12. day of May, the Sunne entereth the first point of Gemini, hauing then declination 20 degrees 12 minutes. The 22. day of June the Sunne entereth into Cancer, where he (making his greatest progresse to the Northwardes) hath 23 degrees 28 minutes of declination. But now in this our time, some doe affirme it to be 23 degrees and a halfe, but it lacketh two minutes. The 24. day of Iuly the Sunne entereth into Leo, continuing downewardes to the Equinoctiall, hauing 20 degrees 12 minutes of declination. The 24. day of August the Sunne entereth into Virgo, hauing declination 10 degrees 30 minutes. The 23. of September, the Sunne entereth into Libra, (then being Equinoctiall and hauing

The greatest declination of the Sun.

The Regiment for the Sea.

Equino-
cial of Au-
tunne.

no declination) which is called the Equinoctiall of Au-
tunne or harvest, where he beginneth his South decli-
nation. The 14. of October the Sunne entred into Scor-
pio, wher his declination is 11. degrees 30. minutes. The
12. of November the Sunne entred into Sagittarius, his
declination being 20. degrees 12. minutes. The 12. daye
of December the Sunne entereth the first minute of
Capricorne, where the Sunne (making the greatest pro-
gresse to the Southwards) hath of declination 23. De-
grees and 28. minutes. From whence he returneth to the
Equinoctiall againe. The 11. of Januarie the Sunne en-
tereth into Aquarius, where his declination is 20. De-
grees 12. minutes. The 10. day of Februarie the Sunne
entereth into the first minute of Pisces, and hath of de-
clination 11. degrees 30. minutes. The 11. day of March,
the Sunne returneth to the selfe same place that it de-
parted from before: wherefore the Egyptians did paint
the yere like to an Adder biting her taile, and (not ha-
ving the use of letters) they made a King, and named
it Annulus, as it were Annus, that is to say, a yere, be-
cause a King doeth tourne rounde in it selfe as dooth the
yere. The height of the Sun being knowne, you know-
ing the day of the moneth, and what yere it is after the
Bissextilis) must turne to the day of the month, in the re-
giment of Table going before, where right against the
day of the moneth you shall finde the degrees of declina-
tion, and the odd minutes belonging to the degrees of
declination following: that being knowne (that is to
say, the height of the Sunne with the degrees & minutes
of the declination) if the Sunne have South declinati-
on, you shall subtract or take away the Sunnes decli-
nation from the height of the Sunne with the Degrees
and minutes: and then that which remaineth shall be
the true height of the equinoctial, which being knowne,
pulling that summe out of 90. with the degrees and mi-
minutes,

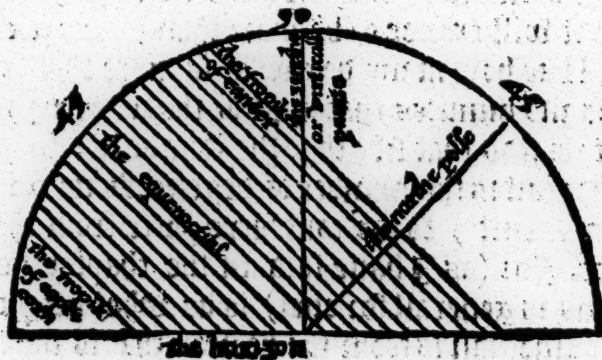
The grea-
test decli-
nation to
the South

The yere
is compa-
red vnto a
King or
an Adder
biting hir
taile.

The
height of
the Sun
being ta-
ken and
knowne

minutes, that which doth remain, shall be the true height of the North Pole above the Horizon. But if that the Sun hath South declination, you shall adde or put that declination vnto the height of the Sunne, which shall shew vnto you the true height of the Equinoctial, of the which summe (being taken from 90. (that which doth remaine, shall be the altitude of the North Pole above the Horizon. For this is to be noted: looke what height the equinoctial is above the Horizon, it is equall or iust so much betwene the Zenith or vertical point, and the North Pole. In like manner, looke how manye degrees and minutes are betwene the Equinoctiall and your Zenith, iust that number of degrees & minutes is from the North Pole downe to the Horizon, which is the cause that you must pull the height of the Equinoctiall, from the Horizon, with the degrees and minutes. For that your Zenith is alwaies 90. degrees from the Horizon, as you see by this figure.

Things to
bee noted
as touchīg
y taking
of the al-
titude of
the Pole.



The Regiment for the Sea.

The viij. Chapter sheweth you how to handle the declination of the Sunne, when you are between the Equinoctiall and the Sunne: that is to say, the Sunne being to the Southwards or Northwards of you betwene the Sunne and the Equinoctiall, or vnder the Equinoctiall: the height of the Sunne being truly knownen or taken.



A thing
to be no-
ted.

Will furthermore if you be vnto the South partes nere vnto the Equinoctiall, so that the Sunne haue any great declination either to the Southwards, or to the Northwards, you being betwene the Equinoctiall and the Sunne, when you haue taken the true height of the Sunne with the Astrolabe to know the height of any of the 2. Poles, do this: seeke the declination of the Sunne for that daye, with the degrees & minutes, the declination being knownen and the height of the Sunne in like manner, then adde the declination of the Sunne vnto the height thereof, and it will excede, or be more than 90. Degrees, then againe looke how many degrees it is more than 90. with degrees and minutes, that shall be the true height of the Pole towards that side that the Sunne is: because the Equinoctiall is the number of degrees aboue 90. (which is your Zenith) to the contrarie parte from the Sunwardes. For (as I haue said in the chapter going before, and is generall for euery) looke what height soeuer the Equinoctiall is from the horizon, that is the true distance betwene the Zenith and the Pole: in like manner, looke what distance is betwene the Equinoctiall & the Zenith, the same is the true distance betwene the Horizon and the Pole, that is to saye, the Pole is so ma-

the degrees in altitude above the Horizon. As it is a com-
mon saying (in knowing howe farre wee bee unto the
Southwardes or Northwardes) that the Pole Articke
is so manye degrees in altitude, or (as some wyll saye,) that wee are in so manye degrees in Latitude: the que-
stion is all one in effecte, although the one bee called Al-
titude or height, and the other Latitude or widenesse,
yet it hath one signification: for as when you saye Alty-
tude or height of the Pole, you meane the Pole is ray-
sed so manye degrees above the Horizon. So lykelwise
when you saye Latitude, you meane, you be so manye de-
grees in widenesse from the Equinotiall, for that your
Zenith or verticall point is so manye degrees from the
Equinotiall. Moreover, if you chauce to be ryght vnder
the Equinotiall, as you cannot saie that you haue anye
Latitude, so lykelwise cannot you saye that you haue any
Altitude, for that the two Poles bee then iust wyth your
Horizon, and in lyke manner the Equinotiall is your
Zenith or verticall point. But when you wyll take the
height of the Sunne wyth your Astrolabe, then looke
what declination the Sunne hath, eyther to the South-
wardes or Northwardes. Then put the declination of
the Sunne vnto the height of the same, and the number
will be iust 90. degrees: if it lacketh any thing of 90. de-
grees, then it signifieth that the Equinotiall lacketh so
much of the Zenith, and so much iust shall the Pole bee
above the Horizon, towardes that parte that you bee in
from the Sunne wardes. But contrariwise if it doth ex-
ceede or be anye thing more than 90. degrees, then (as afore
is declared) it signifieth that the Equinotiall is as much
as that number (both in degrees and minutes.) On the
contrarie side from the Sunne wardes, that is to saie, your
Zenith shall be betwene the Sunne and the Equinoti-
all, & the Pole shall be so manye degrees or minutes above
the Horizon, as is the distaunce betwene the Zenith and

Altitude
or Lati-
tude is all
one que-
stion in
effect.

Being vn-
der the E-
quinocti-
all, you
haue ney-
ther Lati-
tude nor
Altitude,
for that
the Equi-
notiall is
your Ze-
nith, and
the Poles
your Ho-
rizon.

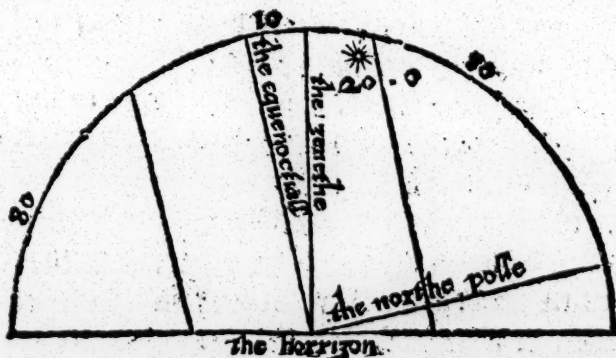
Of your
Zenith be-
ing be-
tween the
Equinoc-
tial & the
Sunne.

The Regiment for the Sea.

An en-
sample

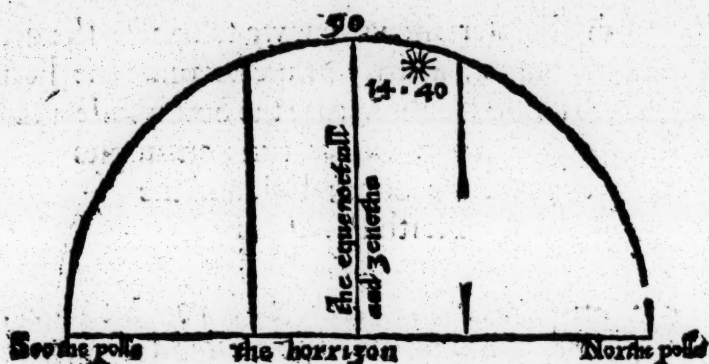
An en-
sample
where y
Pole is 10
degrees a-
boue the
Horizon.

The Equinotiall, towards that part of side that the Sun
is on. Wherefore I doe thinke it necessarie to giue cer-
taine ensamples (and first take this for an ensample.) Ad-
mit I doe take the height of the Sunne vnto the North-
wards 80. degrees about the Horizon, & the Sunne hath
declination vnto the Northwards 20. degrees, to which I
adde or put the height, that is to say 80. degrees, being the
height of the Sun) and 20. degrees, being the declination
of the Sunne, do make 100. from which I pull 90. away,
which is my Zenith, and so there remaineth 10. degrees.
Wherefore you may conclude, that the Equinotiall is
10. degrees to the South part of your Zenith, & the Sun
to be 10. degrees to y North part of your Zenith, so that
the North Pole is 10. degrees about the Horizon, as by
example it is declared.



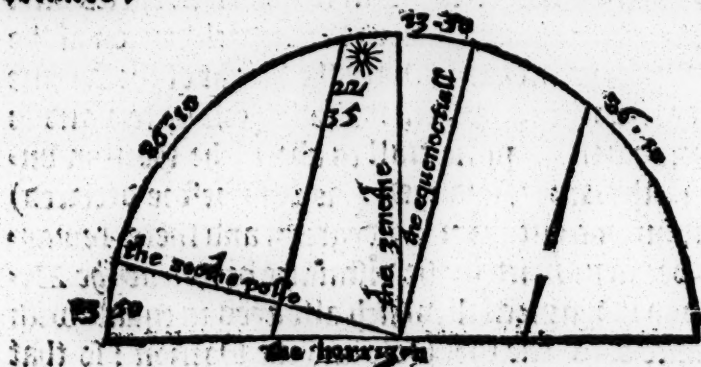
And for the second ensample, admit I take the Sunne
vnto the Northwardes. 75. degrees, and 20. minutes a-
boue the Horizon, the Sunne hauing North declinati-
on. 14. degrees. 40. minutes, I then doe adde or put
14. degrees. 40. minutes, vnto 75. degrees. 20. minutes,
and those two ioyned together makeeth 90. Degrees,
whereof you may conclude, that the Equinotiall is your
Zenith, and then the two Poles be with your Horizon,
as by this example it doth appeare.

And



And now followeth the third ensample. I admit the Sunne be taken with the Astrolabe 81. degrees, and 15. minutes above the Horizon, and the Sunne hath South Declination 22. degrees, 35. minutes, wherefore I do adde 02 put together 81. degrees and 15. minutes, being y height of the Sunne, and 22. degrees, 35. minutes, being the declination, and that maketh 103. degrees, 50. minutes: from which I take away 90. Degrees, which is my Zenith, so that there remaineth 13. degrees, 50. minutes: so that you may safely conclude, that the Equinoctiall is 13. degrees, 50. minutes, unto the North partes of the Zenith, & then it must needs follow, that the South Pole is 13. degrees 50. minutes above the Horizon, as by this ensample it is declared.

An ensample.



The

The Regimena for the Sea

The ninth Chapter sheweth howe to handle the declination of the Sunne, when you are beyonde the Equinoctiall, that is to saie, betweene the South Pole and the Equinoctiall: with certaine ensamples both for the South Pole and the North Pole.



And furthermore, if you bee vnto the Southwardes beyonde the Equinoctiall, as betweene the Tropicke of Capricorne and the South Pole, then to vse the declination of the Sunne to knowe the height of the South Pole or Antarticke

To take the Sunne to the Northward you being betweene the South Pole and the Equinoctiall.

Pole, by the height of the Sunne, there is no other matter in the doing thereof, but whereas wee (being vnto the North partes, doe adde the South declination vnto the height of the Sunne, and rebate the North declination from the height of the Sunne, so in lyke manner the contrarie is to be vled: that is to saie, to rebate the South declination from the height of the Sunne, and to adde vnto the height of the Sunne the North Declination. As for ensamples, I admit the height of the Sunne be taken xviii. Degrees aboue the Horizon one North, and the declination of the Sunne is xxi. Degrees vnto the Northwardes, I doe then adde the declination of the Sunne which is 21. Degrees, vnto the height of the Sunne (being xviii. degrees,) which maketh 49. Degrees and so many degrees the Equinoctiall is aboue the Horizon vnto the Northwardes, and then (as it is before declared) pull that summe out from 90. degrees, and there remaineth 41. degrees, which is the distance betweene the Zenith and the Equinoctiall, which alwayes is equall with the distance betweene the Pole and the Horizon: so that you maye conclude the South Pole to be rayed 41. degrees

An ensample by taking the South Pole 41. degrees aboue the Horizon.

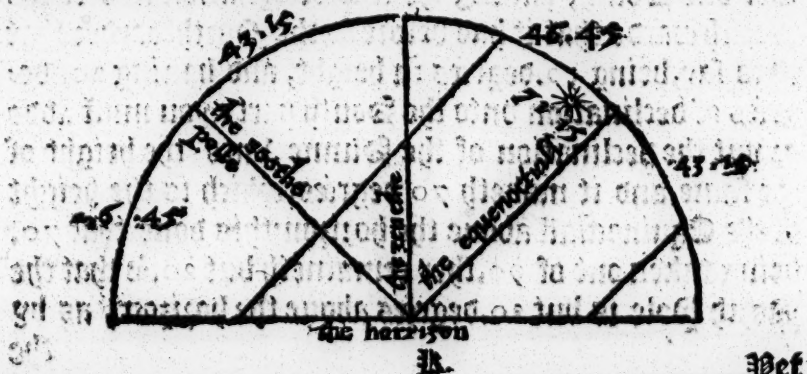
The Regiment for the Sea.

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great above the Horizon. As by this figure it is shewed,



And furthermore if the Sunne haue South declination, the (as before is declared) you must subtract or take away the Sunnes declination from the height of the Sunne, as for ensample. The height of the Sunne being taken at 50. degrees. 30. minutes unto the North parts, and the Sunne hauing 7. degrees and 15. minutes of declination unto the Southwardes, from which height of the Sunne (so) that you are unto the Southwardes beyond the Equinoctiall (you must rebate the declination, which is 7. degrees and 15. minutes, and there resteth 43 degrees 15. minutes, for the true height of the Equinoctiall, which summe you must take out of 90. Degrees, that done, there remaineth 46. degrees 45. minutes, the true height of the South Pole above the Horizon, otherwise called the Antarticke Pole, as by ensample of this figure is plainly shewed.



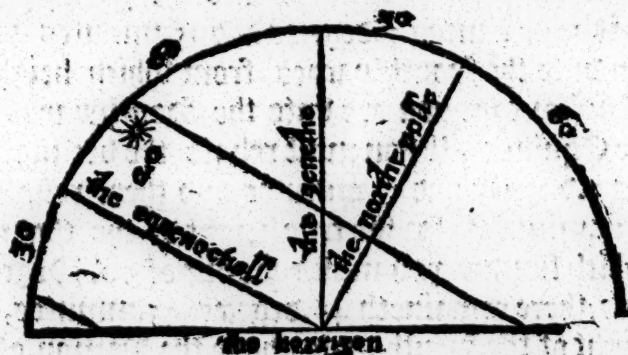
It.

Net

The Regiment for the Sea.

An ensa-
ple by ta-
king the
Northe
Pole 60.
degrees a
boue the
Horizon.

Yet furthermore I doe thinke it conuenient to giue you an ensample vnto the Northwards, that you maye perfectly knowe the true order of the working, both for the North part and also the South parte. Admit therefore I take the height of the Sunne due South, at 50. degrees aboue the horizon, the Sun hauing then North declination 20. degrees: Now (for as much as you haue the North Pole aboue the horizon) you must rebate the Sunnes declination from the height: so that 20. degrees being taken away from 50. there resteth 30. which is the height of the Equinoctiall aboue the horizon, & that 30. being taken from 90. there resteth 60. So that you may boldly affirme the North Pole to be 60. degrees aboue the horizon, as by this figure following it is shewed.

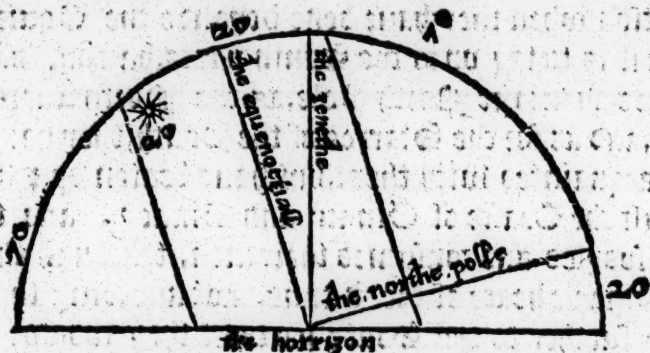


In like manner the Sunne being taken at that height and due South, hauing the like declination also to the Southwards: that it had before to the Northwards: that is to say, being 50. degrees in height, and hauing 20. degrees of declination vnto the South parts, you must adde or put the declination of the Sunne vnto the height of the same, and it maketh 70. degrees, which is the height of the Equinoctiall aboue the horizon: this done, that 70. being taken out of 90. ther remaineth but 20. so that the North Pole is but 20. degrees aboue the horizon, as by the

The Regiment for the Sea.

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The ensample of this figure is the next.



For in handling of the declination, the true height of any of the Poles is knownen. Alwaies hauing this consideration, that if they haue the North pole aboue the horizon, they doe alwaies adde or put to the height of the Sun, the South declination and the Sun hauing North declination, they pul away the Sunnes declination from the height thereof. Now contrariwise, if the South pole be aboue the horizon, you must adde the North declination vnto the height of the Sun, & take away the South declination from the height of the same. Now to knowe which of the 2. Poles be aboue the horizon, is a very easie matter, & is knownen 2. waies. For first if the North pole be aboue the Horizon, you may knowe it by all the starres round about the Pole as Charles wayne, & the Guardes, with such other marks as be about the North pole. Neither can you passe so sodainly beyond the Equinoctiall, but it must needes be knownen vnto you, & then you must vse that kinde of working with the Suns declination, that in the chapter or rule before is rehearsed: and also you may knowe it by the Arke or bearing of the starres and lights round about you. Thus much haue I said as touching the Suns declination, because I knowe that diuers English men would haue tranayled further beyond

A thing to be noted in the handling of y^e Suns declination.

Howe to knowe which of the two Poles be vnder the Horizon.

The cause why Englishmen,

Is. ij.

beyond

The Regiment for the Sea.

haue not
trauailed
far beyōd
the Equi-
noctiall.

An vntē-
perate
place for
extreame
heate.
Tēperate
Clymate

beyond the Equinoctiall than they haue done; but that they haue not had the capacitie to handle the Sunnes declination when they haue bene beyonde the Equinoctiall, that is to say vnto the South parts, hauing lost the markes about the North Pole, as the North starre and other, and as for the Starres of the South, they haue not bene acquainted with them, but haue beaten vp & down alongst the Coastes of Ginney and Binney, and there haue spoyled and consumed their men, thorough the extraordinary heate of the Sunne, not knowing that in going further to the South partes, they shoulde haue brought themselues into a good temperate Clymate againe.

¶ The 10. Chapter sheweth, howe to handle the Sunnes declination vnto the Northwards, where the Sunne dooth not set vnder the Horizon, and also to take the Sunne at the lowest being due North.

Of being
vnder ey-
ther of
the poles

Of taking
y^e heygth
of y^e Sun
due north

FOR further vse of the Sunnes declination, if you haue any occasion to trauell vnto the Northwardes or Southwardes more than 67. degrees of Altitude of any of the two Poles, or if the Sunne haue anye great declination vnto those parts that you are in, then shall not the Sunne goe downe vnder the Horizon in a long time, after as you be in distance vnto the North partes, for if you were right vnder either of the 2. Poles of the world, then would not the Sunne go vnder the horizon in halfe a yeare, so that there should be continually day: And now for the handling of the Sunnes declination, to know the height of the Pole, and to take the Sunne North at the lowest, do this: First with your Crosse staffe, obserue the Sunne at the lowest, taking the true distance betwene the Horizon and the Sunne, that be-
ing

ing truely done, loke what declination the Sunne hath, at the
 then haue you to consider, that except the Sunne be nere ^{lowest.}
 vnto her greatest declination, that is to saie, in the latter
 end of Gemini, (or the beginning of Cancer,) the Sunne
 doth decline little in 24. houres: but if the declination
 be verie I wiste, you must seeke the Sunnes declination
 vpon the daie before, and the daie after, halfe the diuer-
 sitie of which shall be the Sunnes declination: for that
 the Sunne is at the angle of midnyght. The Sunnes
 true declination being knowen, rebate the heighth of the
 same from the declination of the Sunne, and so shall you
 haue the true content in degrees and minutes, that the
 Equinotiall is vnder the Horizon due North, and then
 pulling that summe from 90. that which remaineth,
 shall bee the height of the Pole aboue the Horizon: for
 as it is before declared, loke what heighth the Equi-
 notiall is aboue the Horizon, that is equall the distaunce
 betwene the Pole and the Zenith, and loke what di-
 staunce is betwene the Equinotiall and the Zenith, the
 same distaunce is betwene the Pole and the Horizon: in
 lyke manner, loke how deepe vnder the Horizon, the E-
 quinotiall is vnto the Northwardes, so farre equall is
 the height of the Equinotiall vnto the Southwardes. As
 for ensample, admitte I were vnto the Northwardes of
 the North cape, the Sunne being in her greatest declina-
 tion vnto the Northwardes, which is about the xi. daie
 of Iune. 23. degrees and nere a halfe: this being knowen,
 I take the Sunne due North at the lowest, iust five de-
 grees aboue the Horizon, the declination being xxiii. de-
 grees and 28. minutes. Wherefore I rebate from that
 five degrees, and so ther remaineth 17. degrees and 28. mi-
 nutes. For the depth of the Equinotiall vnder the Hori-
 zon, and then doe I pull that summe from 90. and there
 remaineth 72. degrees. 32. minutes, for the true heighth
 of the North Pole aboue the Horizon, as by this ex-
 ample

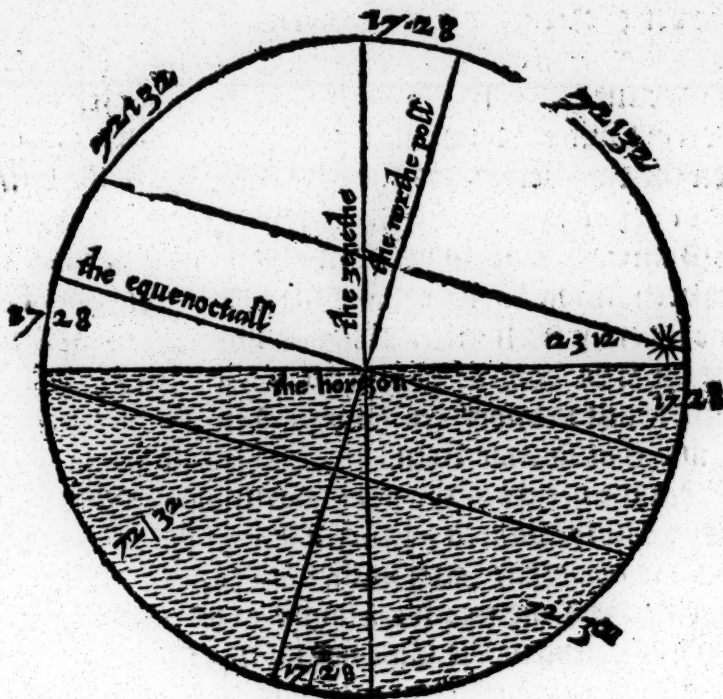
A thing
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 ing the
 Sunnes
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A thing
 to be no-
 ted of the
 pole and
 the Equi-
 notiall &
 Zenith, &
 the Hori-
 zon.

The Sun
 taken due
 North at
 6. degrees

The Regiment for the Sea,

sample it is declared.



By this ensample you may also know the true height of any of the two poles, and how to obserue the Sunne at the lowest, when the Sunne commeth nearest vnto the Horizon, as well as you may when the Sunne is vpon the Meridian at the greatest heygth from the Horizon, which is verie necessarie for them that doe occupie vnto the Northwardes, as vnto Saint Nicholas in Roufey, it is also verie necessarie for them that would attempt any voyages of discouerie to finde out the passage to come vnto Cataye and China, and the Ilandes of Moluccas, vnto the Northwardes, as into the East by Noua Zemla, Eastward or to the West by that waie that Captaine Frobisher, hath

The Regiment for the Sea.

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hath begun to the Northwardes of Baculayas and Labradoz, for it is to be supposed that amongst that broken landes and Ilandes, that there may be founde passage upon the North part of America, but the greates quantities of Ice maye somewhat hinder the prosperitie of that discoverie, and yet notwithstanding my opinion is, that it is not frozen there so much as to have such huge quantity of Ice, but that it maye be frozen more farther unto the North partes, and so by some current or streame brought thether, and so is stayed upon the coast of Labradoz and Baculayas, by the meanes of the great current that cometh out of the Bay of Mexico, all alonge the North side from Floriday unto Baculayas or New-found land.

by Noua Zemla, or to y Westward by Cape de Paramantia.

Additions.

And yet notwithstanding, it may be possible y if that they did discover more unto the Northwardes, that they should not meete with so much Ice. For at the North cape in Norway, which is much more unto the Northwardes, ther is seldome scene any great quantity of Ice, & yet some Ships hath ben beaten of unto the North of y Cape nere 200. leagues, so that they had then nere 80. Degrees of height of the North Pole above the Horizon, and yet they haue not met with Ice, and yet it is farther unto the North partes by 17. degrees, then that place that Frobish-er was at.

Wherefore if it were attempted, there is no doubt but they shoulde finde it pauiable eyther to the East part, or to the West parte: And I am of this opinion, that the thing most feared in making theyr discoverie, unto the Northwarde, deserueth not so greatlye to be feared as they doe make it, the cause why they are so loth to goe verie farre unto the Northwardes, is, for that it is the frozen Zone, but my opinion is, that in Summer-time it is not to be feared, but the further unto the North

The Regiment for the Sea.

Of temperatenes
the Pole
being raised 80.
degrees.

The length
of the parallel 80.
degrees, is
but 1250
English
leagues.

Northwardes, the more temperate warme, by meanes
of the long continuance of the Sunne: for as wee see by
common experience, that a thing once being made warme,
cannot sodainly bee made colde, neyther is there doubt of
any great colde vntill the Sun be vnto the Southwardes
of the Equinotiall: for I admit that a shippe should saile
vnto the Northward, and not stay vntill the North Pole
were elcuated 80. degrees above the Horizon, I do thinke
then they shoulde finde it verpe temperate and warme,
vnto the middle of September, for that by the space of
nine weekes together, that is to say, from the tenth day of
May, vnto the twelfth day of July, the Sun should come
no nearer vnto the Horizon due North then ten degrees,
and 30. degrees vnto the South parte above the Horizon,
and yet it is possible that it may be colde there vntill the
ende of Maie, for that the Sunne must haue a tyme to
make the aire warme. For lyke as a thing once being
colde, cannot be sodainely made warme, so in lyke man-
ner a place being once made warme, cannot be sodainely
made colde. And furthermore, hee that were in the Lati-
tude of 80. degrees, shoulde haue but a short Paralell: for
the whole compasse of the Earth and Sea going East and
West, to come rounde about to that place againe in the
same Paralell, is but 1250. Englysh leagues, auery league
containing thre English miles: So that in sailing of lesse
then 500. or 600. leagues, they might see whether it were
nauigable or not. For this is one principle, that if that
they doe not meete with lande, then they shall finde sea, to
accomplish the long desired passage to finde out Cattaye.

The

the Regiment for the Sea.

41

The xi. Chapter doth shew how you shall know the length of the day, and to know how much the daye is shortened or lengthened by the Sunnes declination.



NOW I thinke it conuenient for Seafaring men to knowe the length of the daye in any place that they haue occasion to goe vnto : for that they haue occasion to trauell into all the climates & places, transporting themselues manye times quickly from one place vnto another : & although the auncient wꝛiters haue appointed certaine climates, and other late wꝛiters in lyke manner haue made Tables very exact for the longest or shortest day in anye of those clymates and other places, according to the eleuation of the Pole: yet haue they not opened any way vnto them, in giuing any order, for them to know when the day is an houre longer or shorter, whereby they myght at all times know the length of the day, which notwithstanding is very necessarie for them, for that they be abroad vnder saile both night & day, and in like manner for that they must keepe account of houres and times exactly, in as much as they ought to keepe an account of the shippes way : wherefore it must needes be most necessarie for Nauigation, to knowe the true tyme of the Sunns rising and setting, which you shall know by this meanes : First this as it is not vnknown, that vnder the Equinoctiall the Sunne is 12. houres aboue the Horizon, and 12. houres vnder the Horizon, (what declination soeuer the Sunne hath) so that there the Sunne riseth at 6. of the clocke & setteth at 6. of the clock for ener. And where the Pole is raised 16. degrees and 44. minutes, there the longest day is 13. houres, (the Sun ha-

How necessarie it is for a Seafaring man to know the length of the daye. Vnder the Equinoctial, day is alwaies 12. houres long. The Pole

The regiment for the Sea.

16.deg.
44.mi.
day.13.
houres
lōg whē
itis at the
longest.

The Pole
30 deg.48
mi. the
lōgest day
14 houres
long.

The Pole
41.deg.23
mi.the
lōgest day
15.hou
long.

The Pole
raised.49
deg 1.mi.
then the
lōgest day
is 16.hou.
long.

The Pole
raised 54.
degr.30.

uing her greatest declination at 23.degrées 28.minutes) and the shortest daye is 11. houres long: and then looke when the Sunne hath declined 23.Degrées and a halfe either backwardes or forwardes, for then the day is an houre longer or shorter and proportionably: when the Sunne hath declined 11.degrées 44.minutes, then it is halfe an houre longer or shorter, &c. Moreover where the Pole is eleuated 30.degrées 48.minutes, there the longest day is 24.houres, and the shortest daye is 10.houres long, the Sunne then rising at 5.of the clock, and setting at 7.of the clocke, and ther when the Sun hath declined 11.degrées and 44. minutes from the Equinoctiall, &c. vnto the greatest declination, then the daye is an houre longer or shorter, and when the Sunne hath declyned 5.degrées 52.minutes, then the day is halfe an houre longer or shorter, &c. Furthermore also, where the Pole is raised 41.Degrées 23.minutes, there the longest daye is 15.houres, and the shortest 9. houres long, (the Sunne hauing his greatest declination, and as then rising at 4.of the clocke 20.minutes, and setting at 7.of the clocke 30.minutes) so that there when the Sunne hath declyned 7.degrées 49.minutes from the Equinoctial, the day shall be an houre longer or shorter, and when it hath declined 3.degrées 54.minutes, the day shall be halfe an houre longer or shorter, &c. And furthermore, where the pole is rayfed 49. degrées one minute, there the longest day is 16.houres, and the shortest 8.houres long, & Sun rising at 4.of the clocke, and setting at 8.of the clocke, so that there when the Sunne hath declined 5.degrées 52. minutes from the Equinoctiall, then shall the daye be an houre longer or shorter. And when the Sunne hath declined 2.degrées 56.minutes, then the day shall be half an houre longer or shorter, &c. Yet furthermore, where the Pole is raised 54.degrées 30.minutes, there the longest daye is 17. houres, and the shortest 7. houres long, the

the Sunne then rising at 3. of the clock 30. minutes, and setting at 8. and 30. minutes: then when the Sunne hath declined 4. degrees and 41. minutes from the equinoctiall, to the greatest declination, the day is an houre longer or shorter, and when he hath declined 2. Degrees 21. minutes, the day is halfe an houre longer or shorter, &c. Where also the Pole is rayfed 58. degrees 27. minutes, there the longest day is 18. houres long, and the shortest but 6. and then when the Sunne hath declined 3. degrees 55. minutes from the Equinoctiall, then the daye shall be an houre longer or shorter: and when the Sun hath declined 2. degrees lacking two minutes, then the date shall be halfe an houre longer or shorter. Furthermore also, where the Pole is rayfed 61. Degrees. 18. minutes, there the longest date is 19. houres long, and the shortest but 5. houres: then shall the Sunne rise at two of the clocke 30. minutes, and set at 9. and 30. minutes, and then when the Sunne hath declined 3. degrees and 21. minutes from the Equinoctiall, then shall the daye be an houre longer or shorter, &c. Furthermore, where the Pole is rayfed 63. degrees. 22. minutes, there the longest day is 20. houres long, and the shortest but foure houres, then shall the Sunne rise at two of the clocke, and sette at tenne of the clocke, and when the Sunne hath declined two degrees, and 56. minutes from the Equinoctiall unto the greatest declination, then shall the day be an houre longer or shorter, &c.

Now where the Pole is raised 64. degrees 49. minutes, there the longest day shall be 21. houres long, and the shortest but three houres: and then when the Sunne hath declined but two degrees. 36. minutes from the Equinoctiall unto the greatest declination, the day shall be an houre longer or shorter. Where also the Pole is raised 65. Degrees, there the longest date shall be 22. houres, and the shortest but two houres long; and when that the

Lij.

Sunne

mi. then y
longest day
is. 17. hou.
long.

The Pole
raised. 58
deg. 27.
mi. the
longest day
is 18. hou.
long.

The pole
rayfed 61
deg. 18.
mi. the
longest day
is. 19. hou.
long.

The Pole
63. deg. 1.
mi. the
longest day
20. houres
long.

The Pole
rayfed. 64
deg. 49.
mi. y lon-
gest day
21. houres
long.

The Pole
65. deg.
the longest
daye. 22.
hou, long

The Regiment for the Sea.

Sunne hath declined but 2. degrees & 20. minutes from the Equinoctiall, &c. then the day shall be an houre longer or shorter, &c. And where the Pole is rayled 66. degrees 20. minutes, the longest day shall be three & twentie houres long, and the shortest but one houre long, and then when that the Sunne hath declined but two Degrees 8. minutes, then the day shall be an houre longer or shorter, and then where that the North Pole is rayled 66. degrees and 32. minutes, there it is 24. houres long, for that when the Sunne hath his greatest declination vnto the Northwardes, then at midnight, you shall see halfe the Sunne, and then when that the Sunne hath the greatest declination vnto the South parts, then you shall see but halfe the Sunne at noone, and then in the going but 15. miles further vnto the Northwardes, that is, but one quarter of a degree, then the Sunne shall be cleane about the Horizon at the due North, and not scene vnto the South at noone about the Horizon, the Sun hauing his greatest declination to the South, and then the day shall be an houre longer or shorter, when that the Sunne hath declined one Degree 57. minutes from the Equinoctiall, and so forth vnto the greatest declination. And thus much haue I sayde as touching the length of the day, whereby you may knowe at all times the true length of the daye in any Latitude betwene the Equinoctiall and the elevation of the Pole at 66. degrees and 32. minutes, by knowing how many degrees the Sunne is declined, and that you may know on euery day by the regiment going before, hauing this consideration, that if the Sunne being vpon the Equinoctiall, and hauing no declination, that then in any Latitude the day is alwayes iust 12. houres long. And you must note this, that it is called the day from the rising of the Sunne, vnto the setting of the same vnder the Horizon, and not from day light vnto day light. For before the Sun rise, and after

The Pole
 66. degr.
 20. mi. the
 longest day
 23. hour.
 long.

The Pole
 66. deg. 32
 mi. then y
 Sun shall
 not set vn
 to them.

The Sun
 cleane a-
 boue the
 Horizon
 due north
 & not to
 appeare
 about the
 Horizon
 South, at
 noone.

To know
 the length
 of y daye
 at anye
 time in a-
 ny place
 What the
 day is.

after that the Sunne is set, it is counted for no parcell of the daie, but it is called the daie light. And furthermore, the daie light will appeare by that time that the Sunne both touch the 17. degree of the Horizon before the Sunne rising, and also the daie light will not be cleane gone vntill the Sunne be more than 17. degrees vnder the Horizon: for as you may perceiue here with vs at London, that when the Sunne hath his greatest declination vnto the Northwards in June, that the daie light remayneth all night, for that the Sunne goeth not vnder the Horizon, but 15. degrees and two minutes.

The xii. Chapter is of the North STARRE.

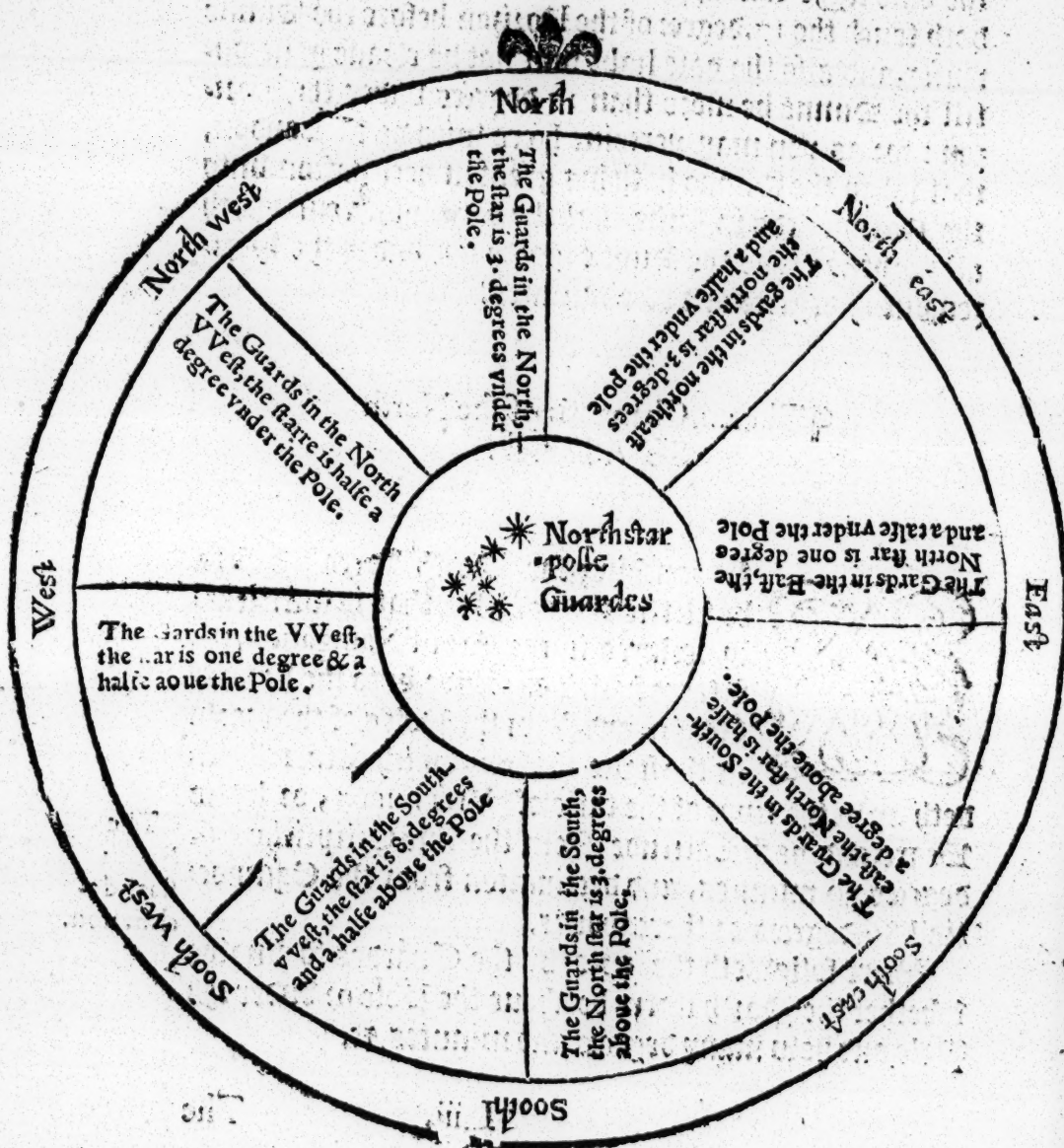


As touching the North Starre, I saye but little thereof, for that is sufficiently declared in the Art of Nauigation, the Starre hath Longitude vnto the signe of Gemini, and from the Poles of the world in the signe of Aries, which Starre standeth vpon the tippe of the taile of Vrsa minor, or lyttle Beare, and hath Latitude from the line Eclipticke 66. degrees. 30. minutes, and declination from the Equinoctiall 86. degrees or thereabouts.

The
North
stars de-
clination.

Here followeth the note by the Guardes to knowe whether the North Starre be aboue the Pole or vnder the Pole, and how many degrees and minutes, &c.

The regiment for the Sea.



The regiment for the Sea.

44

The 13. Chapter doth shew you by the sayling vpon the quarter of your Compasse, in how farre sayling you do raise a degree, and what you do depart from the Meridian, & in the end there is a demonstration therof: reckning it as you doe saile vpon a flat, but not Spherall.



Furthermore, because there be some that desire to know the alteration of a point: to this end, that in running of one point, they may raise or lay a degree sooner in one then in another: as in sailing South or North keeping one Meridian, they raise or lay the Pole. As this for example: In going to the North, you do raise the Pole, and lay the Equinoctiall: contrariwise, going towards the South, you lay the Pole, and raise the Equinoctiall. But in sailing or going East or West, you doe neither alter your Pole nor Paralell, but onely your Meridian. Whereas in sayling of any other point you doe alter both your Pole and Paralell, and also your Meridian. Wherefore I will open vnto you (in sailing vpon one of the quarters of the Compasse) what euery point both raise or lay one degree, in how farre sailing, & how many miles you be departed from the place you departed from, and what space you be departed from your Meridian.

In going South-
vards
you raise
the equinoctial, and
lay the pole
In going
to the north-
vards
raise the
Pole and
lay the Equinoctiall.

But here is one thing to be noted (as I suppose) in the most part of Cards they allow for euery degree, but xviij. leaguess & a halfe: your Cards be most commonly made in Lishborne, in Portugal, in Spaine, or els in Fraunce. But as I take it, we in England shuld allow 60. miles to one degree: y is: after 3. miles to one of our English leagues, wherfore twentie of our English leagues shuld answere to

Of English
leagues
and
Spanish
leagues.

The Regiment for the Sea.

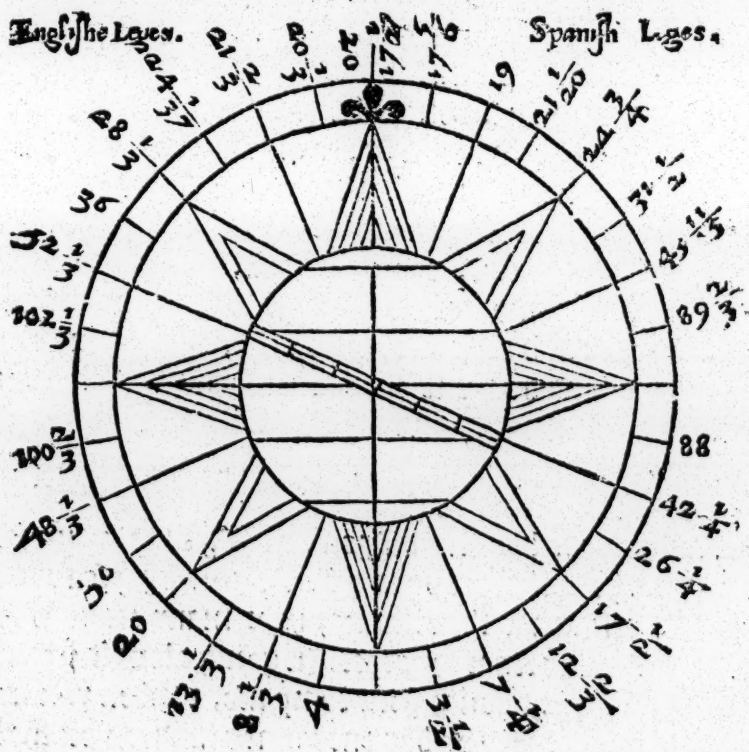
to one degree, for that three of our miles will not make one of their leagues, and because they make theyr accounts by their leagues in the Cardes, and not by ours, therefore I will shewe you by our English myles. An English myle containeth a thousand paces, and euery pace five fote, and euery fote twelue inches. Now some thinke that a pace cannot be five fote, but a pace Geometricall is two reasonable steppes, for it cannot bee a pace, vntill the hinder fote bee remoued forwarde, and those two steppes will containe five fote, and so may any man indure to goe at pleasure. But now to our purpose. For the sayling of one quarter of the Compasse, this is to be noted: First that in sayling directly South or North, you doe raise or laie the Pole a degree in three score miles going. In the altering of one point from the South or North in three score and one miles: and you bee departed from the lyne of the East and West, or the Meridian twelue miles. In altering of the second point, you rayse a degree in sailing three score and five myles: and depart from your Meridian 25. miles. In altering of the third point, you doe rayse or laye one degree in sailing three score and twelue miles, and a 9. part: and are departed from your Meridian 40. myles. Moreover, in altering of the fourth point, you doe rayse or laye a degree in the going of foure-score and five miles: and depart from your Meridian three-score myles. In altering of the fift point or winde, you raise a degree in the sayling of 108. myles: and departe from your Meridian foure score and tenne miles. In sailing by the sixt point, you rayse or laye one degree in 157. miles: and departe from your Meridian lyne 145. miles. Last of all, in sayling by the seauenth point or winde, you doe rayse a Degree in going of 308. myles: and departe from your Meridian line. 302. myles: and after this manner you maye consider of the other three quarters of the Compasse. But if you

A degree
is 60. mi
les or 20.
Englysh
leagues.

A note to
knowe in
how far
sayling
you doo
rayse or
laye a de-
gree in y
sailing by
anye one
point of y
compasse.

you require to know the rayling or laying of a degree by the leagues of the Cards: that is, at 17. leagues and a halfe: then read the Art of Nauigation, and there shal you finde how many degrees you be departed from your Meridian, & also from the place that you departed from: and yet that serueth for none other place but onely for vnder the Equinoctiall, for he that maketh account of it in anye other place, shall be deceiued. For euer as you goe to any of the two Poles, your degrees styll be shorter and shorter, till such time as your Meridian meete vnder the two Poles, whereof I intreate in the sixtene Chapter.

For the better vnderstanding of the things aforesayd, looke on this figure following.



The Regiment for the Sea.

¶ The 14. Chapter teacheth to know how farre any land is off from you, knowing but the distance betweene any two places : whether you run along by the land, or directly to the shore, or otherwise, with other necessarie things.



Do that I know it very necessarie & profitable for Sea-men to know, how néere or far they be into the Sea, and how néere to the land, I wil intreate ther of for diuers cōsiderations. And first, because in rûning alongst the land there may be danger, which may be such a certayne quantitie into y^e Sea, that they

may go both within them and without them. And also in like manner, for that being at one distance from y^e land, the land may rise in such a shape or fashion, whereas being néerer, the land may rise in an other forme or fashion : for being farre off, you shall see the hills within the land, and being néere, the hills or cliffes néere vnto the Sea coast, may take awaye the sight of the land within. Furthermore also it is very necessarie, to know in what fashion the land doth rise vpon diuers points of the compass, as oft as the fashion of y^e land doth alter, & to note it in some book for remembrance. First by what points of the compass, then the fashion, & last, at how farre off, &c. For knowledge how far off you be frō y^e land, you may haue this help, if there be any two places by y^e sea coast, whereof you know the distance, how many leagues or miles the one is from the other. In going alongst y^e coast you shall set them with your compass, & when you are thwart of thē, if they be but one point asunder, you shall be fīue times y^e distance betweene them from y^e lande or shore

A note
for y^e land
rising in
diuers
shapes or
fashions.
To know
how far
the lād is
from you
Where 2.
landes be
but one
poynt a-
sunder.

Shore. If the two places be two points asunder, then the distance vnto the shore, shall be two times and a halfe the distance. If 3. points asunder, then the distance vnto the shore shall be once the distance and a halfe. If foure points asunder, the same distance shall be betwene you and the shore, that is betwene the two markes. If five points asunder, then is it vnto the shore but two thirde parts of the distance betwene the two places. If 6. points asunder, (you being thwart of one of them) then shall the distance vnto the shore be, not halfe the distance betwene the two places. And in all these cases before rehearsed, the one place must be thwart of you, the other must be a head or sterne of you: and so it is exact and true. As for ensample this: I (going alongst by any Coast) doe know before hand, how the one place doth beare fro the other, besides this also I knowe the distance, that is to say, how many leagues they be asunder. As for ensample, the two places assigned beare East and West the one from the other, I then (knowing that they be 3. leagues asunder) when I haue brought one of the places South or North of me, doe set them with my compasse, the one being North of me, and the other bearing North and by East, that is one point asunder: Now the distance vnto the shore being 5. times the distance betwene the two places which be 3. leagues asunder, I know the shore to be 15. leagues from me, which (if the places were but one league asunder) should be but 5. leagues from the shore. Furthermore, if the places be two points asunder, that is to say, $\frac{1}{2}$ one North, & the other North northeast, then shall the distance vnto the shore be 7. leagues & a halfe from me. Whereas if the 2. places were but a league asunder, it shuld be but 2. leagues & a halfe vnto the shore. And furthermore, if the places be 3. points asunder, that is to say, the one north, & the other northeast & by north, the distace vnto $\frac{1}{2}$ shore shalbe 4. leagues & a halfe: wher

Of 2. places to bee 1. pointe asunder.

To bee 2. pointes asunder.

3. pointes asunder.

The Regiment for the Sea.

4. pointes
asunder.

5. pointes
asunder.

6 pointes
asunder.

Of going
or sailing
right into
the shore

As if the two places were but one league asunder vnto the shore, it should be but a league and a halfe. If 4. points asunder, y^e is to say, if the one place be due North, and the other place North-east, then it is vnto the shoare thre leagues iust. If but one league asunder, then but one league vnto the shore. Moreover if y^e two places bee five points asunder, that is to saye, the one North, & the other North-east and by East, then the distance vnto the shore shall be but .2. leagues: whereas if the two places were but one league asunder, vnto the shore shoulde bee but two miles. Last of all, if the two places be 6. points asunder, that is to say, the one North, and the other East North-east, then it shall not be a league and a halfe vnto the shore, &c. But if you come directly to the Landwardes, hauing no cause to be thwart of none of those knowen places, then to knowe how far you be from the land, you must doe as is by the places before spoken of. For if you goe in due North, the one place being North and by west, & the other North & by East, then (the two places being 3. leagues asunder, you shall be 7. leagues and a halfe from the shore: so that if you runne into the shore due North, vntill they be 4. points asunder, that is to say the one North North-west, and the other North North-east, then it shall be vnto the shore 3. leagues and 3. quarters. And furthermoze, you still running in due North till the 2. places be 6. points asunder, that is to say, the one place to be North-west and by North, & the other place to be North-east & by North, the distance vnto the shore shall be 2. leagues & a quarter. And again, if you runne in due North, vntill they be 8. points asunder, that is to say, the one place North-west, and the other North-east: then the distance vnto the land or shore, shall be but halfe the distance betwene the 2. places that is, but one league and a halfe. Lastly, if you runne to the land due North, vntill the 2. places be 10. points asunder, that

that is to saie, the one place Northwest and by West, and the other Northeast and by East, then the distance vnto the shoare shall be but one third part of the distaunce betwene the 2. places, that is, but one league from the land, &c. Thus much haue I sayde as touching the bearing of the land from you, by the points of the compasse, to know the distaunce, or how farre the land is off: which is very necessarie for Seamen to knowe, for diuers considerations, as I sayde before. If now therefore you knowe not how one head-land doth beare from another, doe thus: in running alongst the Coast, when you see the appearing of any lande one before another, set them with your compasses, and looke how they beare from you, by what point of the compasse, and so shall you knowe iustly, how the one lande doth beare or lye from the other. And by this order you may correct your plats, by doing this, as often as you see two notable places together: as Ilands, rockes, head-lands, mouthes of hauens, sandes, or whatsoever else bee worthis of noting, this done, as often as you doe see them together, set them with your Compasse, and that will shew you most certainly, that so they doe beare the one from the other. You may know the distaunce in lyke manner betwene them, if you knowe your shippes way, as thus: when you first see any two places together, as two head-lands, or two Ilands, hauing set them with your Compasse, and knowing how the one beareth from the other, then, for that you wyl not come neare vnto them, you doe hale off from the land vntill that you haue brought your selfe farre inough off, at your discretion and when you be thwart of the first head-land, set the other land, and consider how it beareth from you: then reckon your shippes waie, howe many leagues the shippe myght goe, vntill you come thwart of the other head-lande, keeping your course along, as the two head-lands beare, & so shall you both know the distance betwene the 2. places, &

A vvaie
to know
how one
head land
beareth of
another.

To know
the distance
at Sea be-
twene a-
ny two
headlands

The Regiment for the Sea.

To know
howe far
it is vnto
the lande
an other
vway.

also how farre you be off from them. In lyke manner, hauing consideration of the distaunce betwene the other places that you haue obserued, both by your compasse, and also the shippes waie, you may knowe how farre it is to the shoare, going right to the land-wards, by your crosse staffe, although you know not the distance betwene any two places.

As thus: take the wideness betwene anye two places wyth your Crosse staffe, bearing right to lande, wards, and then remoue the Crosse staffe, or Transuastorie, halfe the length of the transuastorie, that is to say, the end next vnto you, and then by running in till the two ends of the transuastorie doe agree with the two marks, you shall be halfe way to the shoare: then looke how farre the shippe hath gone in that time, for the same distaunce is vnto the land from the shippe. But if you remoue the transuastorie but a quarter the length of the transuastorie to you wardes, then at the place where the ende of the transuastorie doth agree with the two marks, shall be one quarter of the distaunce betwene the shoare and you at the first obseruation: & it shall be thre times the quantitie vnto the shoare, &c.

To know
the ships
vway.

As I doe farther shewe the conclusions of the Crosse staffe in my booke called The Treasure for Trauailers, the first booke the 10. 11. 12. 13. and 14. Chapters. And to knowe the shippes way, some doe vse this, which (as I take it) is verie good: they haue a peece of wode, and a line to bere out ouer boord, with a smal line of a great length, which they make fast at one end, and at the other end, & middle, they haue a peece of a line, which they make fast with a small threed to stand lyke vnto a crowe foote: for this purpose, that it should drine a stearne as fast as the shippe doth goe awaie from it, alwayes hauing the line so readie, that it goeth out so fast as the shippe goeth. In lyke manner they haue either a minuse of an houre glasse,

The Regiment for the Sea.

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glasse, or else a known part of an houre, by some number of wordes or such other like, so that the line being vered out, and stopt iust with that time that the Glasse is out, or the number of wordes spoken, which done, they hals in the logge or peece of woode againe, and loke howe many sadame the shippe hath gone in that time: that being known, what part of a league so euer it be, they multiplie the number of sadames, by the porcion of time or parte of an houre. Whereby you maye knowe iustly howe many leagues and parts of a league the ship goeth in an houre, &c. As for example this: I hauing a minute Glasse, but it is better for to haue a porcion of time by some number of wordes, and the lesser parte of time that you haue, it is the beter, for if that the Shippe doeth goe verie fast, you shall not haue too much lyne out, and if that the Shippe doeth goe but slowlye, then you maye double the length of time by speaking the wordes twice or thrice ouer, and for to worke it truly doe this: first let downe your logge handsomely into the water, and then let the line be marked according vnto the shippe, a two or thre sadame from the logge accordinglye, that it be so farre a stearne that it cometh into quicke water, that the edie of the stearne doth not staye it, and that done, then begin to speake your wordes, and so stayed at iust the end of the wordes, and then hale in your logge againe, and measure howe many foote or sadames that you haue verred or put out in that time, and suppose that your porcion of time is a 120. part of an houre, more or lesse it maketh no matter, so that you doe knowe the iust porcion of time.

An Eng-
lish leage
2500. fa-
dome.

A spanish
league.
2857. fa-
dame.

Additios.

And suppose that you haue verred five and twentie sadames in the hundreth and twentie parte of an houre, therefore multiplie a hundreth and twentie by five and twentie, and of that multiplication there commeth. 3000
Sadame

The Regiment for the Sea.

fadame, and now an Engliſhe league is. 2500. fadame,
Additiōs. ſo that the ſhippe hath gone one league and 500. fadames
in an houre, and the ſayde 500. fadames is the fifth parte
of a league, ſo that the ſhippe hath gone one league and
one fifth part of a league in an houre. And this by mul-
tipling the portion of time by the number of fadames,
you may keepe a verie good reckoning of your ſhips way,
hauing this conſideration, that you doe make as often
times pꝛoofe as the winde doth increaſe or decreaſe.

And ſo; a good order in the keeping your account, doe
this: Looke howe long time that the winde hath blowne
ſteddely without any increaſing or decreaſing, or altering
of your courſe, then when that you doe ſee what or howe
many fadames that the ſhippe hath gone in an houre,
then multiplie it vnto ſo many houres as the ſhippe hath
gone ſo much by, and then diuide all that ſumme by 2500
or elſe it is better to adde all your number of fadames
as long as the ſhippe hath gone one courſe wythout al-
tering: as ſo; enſample this. The ſhippe hath gone ſoure
houres. 25. fadame, in the time of 120. parte of an houre,
that is in ſoure houres. 12000. fadame, and the Winde
increaſing, the went thꝛee houres. 34. fadames. In. 120.
parte of an houre, that is in thꝛee houres. 1224. fadames,
and the Winde decreaſing, the ſhippe went ſiue houres,
but 16. fadames, in the 120. part of an houre, that is. 9600
fadame in ſiue houres, nowe adde all theſe numbers of
fadames together, that is. 12000. and 12240. and 9600.
and all theſe make 33840. So that the ſhippe hath gone
in 12. houres. 33840. fadams, and now diuide this ſumme
by. 2500. which is a league, and then there will ſtande
13. in the quantitie lyne, and 1340. remayneth over. So
that you maye conclude, that the ſhippe hath gone 13.
leagues and a halfe, and 90. fadames: and by this order
you may keepe a verie good order in your reckoning, and
ſo note it in your Booke, and make a marke in your
Cart.

Cart, &c. And this is to be noted, that a Spanish or Portingale league doth containe 2857 fadams, and an English league but 2500 fadams.

The 15. Chapter or Rule, treateth of the Longitude, &c.



Now some there be that be very inquisitive to have a way to get the longitude, but that is too tedious for Sea-men, for that it requireth the deepe knowledge of Astronomie. For this they must consider, that the whole frame of the firmament is carried round from the East to the West, in 24 houres, so as there remaineth neither light nor marke, but goeth rounde, saving onely the two Poles of the worlde, and these two stande alwayes fast. But (as I saide before in the ninth rule) of him that going South or North, doth raise or lay the Pole, and in like case the Equinoctiall altering his Paralell, and causing the light of the Firmament to alter the time of their shining or abiding about our Horizon: so he that goeth directly East or West, doth neither raise nor lay the Pole, so that still the lights of the Firmament doth make one manner of Arch, according to their Latitude or Declination: but the going East or West doth alter the Meridian, causing the Planettes to have their aspects at another houre or time, altering the time of the chaunges of the Moone, and also the time of the Eclipses: which is necessarie for all traualers by sea or by lande. Therefore I thought it needefull to be spoken off: for as countries haue Latitude from the Pole, so in lyke manner they haue appoynted Longitude. Nowe therefore you may get the Latitude with instruments, but the Longitude

Altering
the time
of rising
& setting
of the
lightes.

Altering
y aspects.

The Regiment for the Sea.

Of Latitude and Longitude.

15. degrees is an houre of time & at London it is 555. miles

Longitude begineth at y Canarie Islands.

To know the true time of y aspects of y Moone.

gitude you must bring from another place, which you can not do but with a Globe or els a Mappe or Carte, and then you must measure from the Meridian of the Canarie Islands, otherwise called the fortunate Islands. And in our latitude of London, euery 555. miles which containeth 15 degrees, wil answere to one houre of time: and vnder the Equinoctiall. 900. miles to 15 degrees: the degrees be as long as the degrees of latitude, but towards the Pole, fewer and fewer, til they come to nothing vnder the two Poles. And now 37. miles with vs at London, will aunswere to one degree of our latitude at 51. or 52. degrees of eleuation of the Pole, but the cause why the longitude was fetched from the Canarie Landes, I know not, but it was as I suppose, because it was the Westermost place then known: For Ptholomeus was the first that ordained that rule.

Now furthermore, because you shall knowe the better, I haue drawen out in my seconde Booke, called the Treasure for trauailers, certayne principall places in the whole world, both their Longitude and Latitude by which you shall knowe what manner of Arch the Sun with the other lights doth make, and also by the Longitude you may knowe at what time the Moone with any of the Planets doth make any aspect. Besides this, the Eclipses of the Sunne or Moone, with the change quarters, and full Moone, by a true and exact Ephemerides, through all places, to know the very true houre & minute of time of the Diameter: considering for what Longitude or place your Almanacke was made. And now to get the Longitude, you may do it at the time of the Eclipse of the Moone, for that the Eclipses of the Moone be generall, so that he being aboue your Horizon in any place vpon the superficiall parts of the earth, or Sea, considering (as I said before) by your Almanacke, at that time when the Eclipse shoulde happen,

the

the very houre and minute, knowing also the place that your Almahabke was made for: that done, according to this rule, with a precise instrument you shall take the alteration of the time, with the houre and minute of the Eclipse. And furthermore you might know your longitude with the Ephemerides, by the continuation of the Moone with other fixed stars, if it wer not for one great infirmitie, and that is the Paralel of the Moone, which the Semidiameter of the earth doth cause, by nearnesse of the Moone unto the earth: wherefore I would not any Seamen should be of that opinion that they might get any longitude with instruments. Therefore let no Sea-men trouble themselves with any such rule, but (according to their accustomed manner) let them keep a perfect account and reckning of the way of their ship, whether the ship goeth to lewards, or maketh her way good, considering alwayes what things be against them or with them, as tides, currents, windes, or such lyke.

The Longitude is not to be gotten wth instruments on the sea.

The vxi. Chapter sheweth how many miles wil answer to one degree of Longitude, in every severall Latitude betweene the Equinoctial and any of the two Poles: with the demonstration for that purpose: and the diuersities of aspects of the Moone.



Now by this rule shall I teach you how many miles wil answer to one degree, for every severall latitude to any of the 2. Poles either Artick or Antartick. And first vnder the Equinoctiall, (the 2. poles being euen with the horizon) 60. myles do answer to one degree, as I sayd in the 15. Chapter.

P.ii.

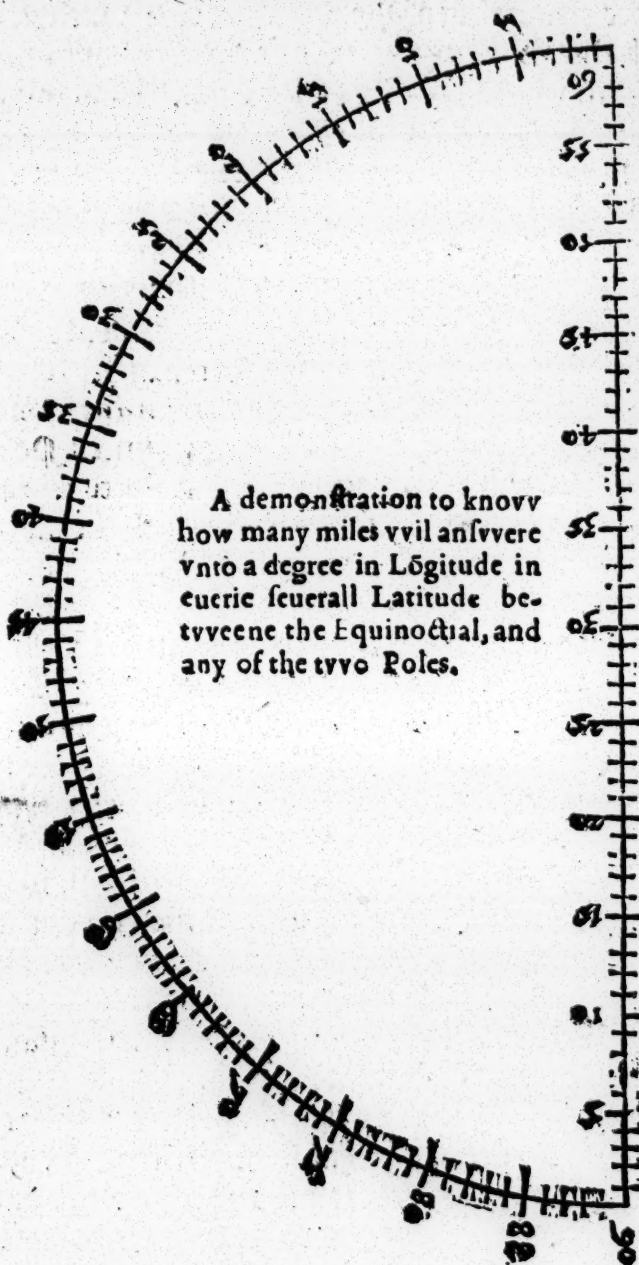
And

The Regiment for the Sea.

And now shall follow the rest. Where the Poles be
rayled 31. Degrees, 56. miles belongeth to one Degree of
Longitude. Nowe the Poles being rayled 29. degrees 52.
miles do aune were to one Degree. The Poles being ray-
led 36. degrees 48. miles do aune were to one Degree.
The Poles 42. degrees rayled 44. miles goeth to one de-
gree of longitude. The Pole rayled 48. degrees. 40. miles
to one degree. The pole rayled 53. degrees 36. miles to one
degree. The Pole rayled 57. degrees 32. miles to one de-
gree. The Pole rayled 62. degrees 28. miles to one degree.
The pole rayled 66. degrees 24. miles to one degree. The
Pole rayled 70. Degrees 20. miles to one degree. The Pole
rayled 74. degrees 16. miles to one degree. The Pole ray-
led 78. degrees 12. miles to one degree. The Pole rayled
82. degrees 8. miles to one degree. The Pole rayled 86.
degrees 4. miles to one degree. The Pole being rayled to
the highest at 90. degrees (being then your Zenith) there
all the Meridians meete. And now shall follow a demon-
stration of halfe a circle, & that shall shew you how ma-
ny miles will make a degree, according vnto euery Lati-
tude that you are in, by the replying of a payze of
Compasses, or a thred made fast at the lower corner at
90. and there in like manner at one of the pointes of the
Compasses, and the other point vnto the latitude, that
you are in, for all Circles is according vnto their Dia-
meters.

The Regiment for the Sea.

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A demonstration to know
how many miles will answere
vnto a degree in Longitude in
euerie seuerall Latitude be-
tweene the Equinoctial, and
any of the two Poles.

For in the halfe
circle is marked
the eleuation of
the Pole: in the
line of diameter
or right line, is
marked y miles
answering eue-
rie degree: and to
know how ma-
ny miles wil an-
swere vnto one
degree, first open
your compasses,
or else laye the
thread vnto the
eleuation of the
Pole y you doe
require y num-
ber of miles vn-
to one degree: &
then y iust length
of the thread bee-
ing marked, laie
the thread vnto
the line of Dia-
meter, or right
line, which is y
line of miles, &
then you shal see
at that place is
the number of
miles vnto one

P. 11.

degrees

The Regiment for the Sea.

15. degrees
 answereth
 vnto an
 houre of
 time.

degree, &c. Nowe you must consider that euerie houre of time in the chaunging of the Moone or of the Eclipses, you must allowe 15. degrees, euerie degree in miles as you doe see in your Latitude of the Countrie, as thus: those places that be to the Westwardes of your towne, place, or countrie, by 15. degrees, the Moone shal change rather with them then with you by one houre, because that they shal touch your Meridian before theirs by one houre. And if the town or place be to the Eastwardes of you by 15. degrees, then shall the Moone change rather wth you than with them by one houre, as for ensample thus: with vs at London the 20. day of May. 1574. the Moone shall change at 12. of the clocke at noone. 5. minutes. Now to the Westwardes as far as Lisbonne in Portugal, the Moone shall change that same day at 11. of y^e clocke 8. minutes, y^e longitude being thereof from y^e Canarie Ilands five degrees. 36. minutes. Now to the Eastwardes, y^e same day at Rome the Moone shall chaunge at one of the clock 12. minutes, because that they haue Longitude 36. Degrees. 40. minutes from the Canarie Ilandes, and then by this account vii. degrees and a halfe will answere to halfe an houre, and then 3. degrees and a quarter will make a quarter of an houre, and then nine miles and a quarter will make one minute of time with vs at London in our Latitude, so by this rule you may knowe at what time and minute the Eclipses or chaunges of the Moone do happen, knowing for what place your Almanacke was made, for as commonly we heere in England doe make them for the Citie of London.

Thus much haue I sayd as touching the true time of the chaunge of the Moone, for that some people (as I haue said before in the third Chapter, doe contempne and say, why doe they not giue or make rules for euer, to knowe the houre and minute of the chaunge, full, and quarters of the Moone? And yet they bee utterly voyde of anye know-

To know
 the true
 time of y^e
 change &
 quarters

knowledge in the Mathematicall Science, whereby they might know the true time of the chaunge of the Moone: For it is a question Astronomicall, to know the Moones motion; a question Geometricall, to knowe the true time of the aspects, or measure betweene the Sunne and the Moone: and thirdly, it is a question Cosmographi- call, to knowe the true Longitude of the place he is in, at the time when the Moone chaungeth, &c.

of the Moone, is a question Astronomicall, Geometrical and Cosmographi- call.

Now followeth the next rule which shall treat of Longitude and Latitude.

The seventeenth Chapter sheweth the Circumference of the whole Earth and the Sea, vnder fundrie Paragraphs, whereby that any Sea-man may know what quantitie or part of the Earth that he hath sailed or passed by the number of leagues, and also he may know the alteration of time, &c.



And nowe furthermoze I doe Additiōs. thinke it not hurtfull but necessarie for to shewe the Circumference of the whole Earth, at sundrie Latitudes from the equinoctiall, whereby in their sailing that they may know what quantitie or part of the whole Earth that they haue passed or gonne, and also what the diuersitie, aspect, or time that they haue altered themselves from any place assigned, which is necessarie for them that shoulde goe of anye long voyage

The Regiment for the Sea.

voyage as this, vnder the Equinotiall the whole earth is in circumference 7200. leagues, and the halfe thereof is in that place, as where his none is mydnight, is keeping that Paralel is 3600. leagues, and the quarter of the compasse is 1800. leagues, and there the diuersitye of time is altered sixe houres, and then in 900. leagues the time is altered thre houres: so that in the sailing East or West vnder the Equinotiall, 300. leagues, shall alter one houre of time in the Eclipses or the chaunges of the Moone, &c.

And now farthermore, where the Pole is rayled, 20. degrees aboue the Horizon and to goe rounde about the earth keeping the paralel, the whole compasse is 9766. leagues, and the halfe of it is 3383. leagues, and there your none is midnyght, and then a quarter of that is 1691. leagues and a halfe, and ther the alteration of time is 6. houres, and then 846. leagues doth alter thre houres of time, so that 282. leagues doeth alter one houre, in the chaunge or Eclipses of the Moone, &c. And now in the Latitude of 30. Degrees from the Equinotiall, the compasse of y^e earth vnder that paralel is 6236. leagues, and the opposite part in that paralel is 3118. leagues, and there none is mydnight, and then the quarter of the compasse of the earth is 1559. leagues, and then passing in that paralel 779. leagues and a halfe, doth alter thre houres of time: so that 260. leagues shall alter one houre in the aspects of the Moone, and also in the Latitude of 40. degrees from the Equinotiall, the whole compasse of the Earth & Sea vnder that paralel, is 5516. leagues: So the halfe is 2758. leagues, and a quarter is 1379. leagues, so that 689. leagues and a halfe, shal alter thre houres of time, and 230. leagues, will alter one houre of time in the Eclipses or aspects of the Moone, &c.

And now where the Pole is rayled 50. degrees, there the circumference of the whole earth vnder the paralel is

is

The regiment for the Sea.

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is 4628 leagues, and the halfe thereof is 2314 leagues, and the quarter thereof is 1157 leagues: so that 578 leagues and a halfe, doth alter thre houres of tyme: so that 193 leagues doth alter one houre of tyme in that paralell. And now in the Latitude of 60. Degrees from the Equinotial in that paralel, it is but 3600. leagues, to go round about the whole earth & Sea, so that 1800. leagues is the opposite parte of that Paralell, and there your none is midnight, so that 900. leagues shall alter six houres of time, and 450. leagues, thre houres of time, and 150. leagues, shall alter one houre of time in the aspects of the Moone, being $\frac{1}{24}$. part of the compasse of the earth, in that Paralell, &c.

And now where that the Pole is rayfed 65. degrees, there the circumference in the Paralell is 3042. leagues, so that the halfe is 1521. leagues, & a quarter of that paralell is but 760. leagues and a halfe: So that 380. leagues shall alter thre houres of time, and 126. leagues & thre quarters, shall alter one houre of time, &c. And also in the Latitude of 70. degrees, the compasse of the earth is in the Paralell 4462. leagues, so that the opposite parte is 2231. leagues, and the quarter is 557. leagues and a halfe, so that 307. leagues and thre quarters doth alter thre houres of time, and 102. leagues, will alter one houre in the Eclipses or change of the Moone. And furthermore, in the Altitude of the Pole 75. degrees, there the compasse of the earth in that Paralell, is 1864. leagues, and the halfe is 932. leagues, and the quarter is 466. leagues, so that the alteration of thre houres of time is 233. leagues, and 77. leagues and 2. mile will alter an houre of time, &c. And also in the Latitude of eightie degrees from the Equinotiall, there the whole Circumference of the Earth vnder that Paralell is but 1250. Leagues. And the opposite parte in that Paralell, is 625. leagues, and then the quarter of that, is but 312. Leagues and a halfe,

The Regiment for the Sea.

halfe, so that 156. leagues wil alter thre houres of time, and 52. leagues will alter one houre, in the time of any Eclipse or any aspects of the Moone, so that you maye see how short that the Circumference of the earth is, at the Latitude of 80. degrees: and this I do cease to shew any further towarde the Pole-wardes, for that it is doubtfull whether that it is Nauigable vnto, so neare the Poles, &c.

¶ The eighteenth Chapter or rule, sheweth
how to sayle by the
Globe.



You can-
not draw
y land &
sea true v-
pon a flat
thing.

To make
a Sea plat
or Carde.

NOW to sayle by the Globe, it is conue-
nient to be spoken off: For that gene-
rally the most part of the Sea men make
their account as though the earth were
a platfome. For they do not consider
that the Earth is a Gloabe, and that the
Meridians do growe narrower and narrower towards
the two Poles, for it is vnpossible to drawe the face of
the earth and the Sea true vpon a platfome, for if you
will describe the land true, then shall not the Sea be
true, for as you goe towards the North parts, your Me-
ridians growe together, so as your lynes or poyntes be
according to the Arte of Hydriographie, for the Sea shall
be broader to the North parts than it is. Now and if
you would describe the Sea true, with lines, courses,
distances, hauens and daungers, then should your land
be broader to the North parts than it is. As for ensam-
ple, thus: England and Scotland being both one land,
in all your Cardes of Nauigation, that doth shewe any
parte to the Southwards, the North parte of Scot-
land is drawen much bigger than it is, for otherwise
the lynes of South and North should not be according
to

to the trenting of the land, for if you view it well, you shall finde the North ende of Scotland much more in distance than it is. As you may see in measuring it by the trunk of your Carde there.

For your better understanding, I haue shewed the compasse of the earth vnder sundrie Latitudes, in the Chapter going before, and by that you may see that the Compasse of the East and West lyne (comming from the Equinodiall) is much lesser to the Northwardes, than it is to the Southwardes. Wherefore when you shall haue any occasion to attempt any voyage to the North parts, it is best to sayle by a Globe: for so shall you better see the distaunces and bignesse of the landes, and in lyke manner your lynes and courses. In this order, first (according to the accustomed manner) keepe a perfecte account and reckoning of the way of the ship, by what lyne or poynt your shippe hath made her way good, then must you resort to your Globe. After that consider what place and paralell you be in, which you maye doe by the Sunne by day, & by the starres by night. Now (knowing what place and Paralell you be in) set your Globe to the eleuation of your pole: that done, turn to the place of your Zenith, and seeke the opposite of it in your Paralell: for then you know that in the same Paralell is your East and West lyne: that had, the iust quarter of that Circle to the Pole, must be deuided into the eight poynts of your compasse, doing so lykelike on the other side.

How to
use y^e glo-
be to di-
rect your
course, &
to knowe
howe that
any place
doth bear

In lyke case if you come to the Southwardes, deuide your 8. windes from your Antarticke Pole, to your Paralell circle: and thus must you doe euer and anone, for the oftener you doe obserue this custome, the better and perfecter shall your course be. Now thus briesly I make an ende of the sayling by the Globe. But for them y^e doe occupy y^e Southparts, nothing is better than their cards.

The Regiment for the Sea.

Because I haue declared vnto you the length of certain of the Paralells, what leagues the earth doth containe in compasse vnder them, now will I shewe you how many leagues distance there is, from one Paralell vnto another, accordingly as I haue set downe, in the Chapter next going before this, as I doe shew the Circumference first vnder the Equinoctiall, and then in the Latitude of 20. Degrees, and then 30. Degrees, &c. And first from the Equinoctiall vnto the Latitude of 20. Degrees is 400. leagues, and from 20. degrees vnto 30. Degrees in Latitude, is 200. leagues. The lyke is from 30. vnto 40. Degrees, and from 40. to 50. and from 50. to 60. So that there is from the Latitude of 60. degrees vnto the Equinoctiall 1200. leagues, and there a Degree of Longitude is but halfe so much as it is vnder the Equinoctiall, and the whole circumference of the Earth, but halfe so much in like manner, and also from the Latitude of 60. Degrees vnto the Pole is but 600. leagues, and there all the Peridians doth meete: and it is from the Equinoctiall vnto either of the 2. Poles of the worlde 1800. leagues, &c. Which is the fourth part of the compasse of the whole Earth.

The cause
why that
you maye
see y^e sailes
of a ship,
& not the
holde.

Furthermore, for that you maye the better vnderstande, that the Earth is a Globe or Circular (which any person that doth occupye the Sea, seeth most apparantly) you shall perceiue it thus: if you see a Shippe any thing farre off, you may perfectly see the sailes of it, but not the holde, the cause whereof, is the Circularnesse of the earth, and the water of the Sea: for that the water doth rise and swell between you and the other ship, according to the distance betwene both the Shippes, because the distance to the Center of the Earth or water, is in every place alike. And he that hath desire to know further hereof, M. Dee hath made mention thereof in Euclides Elements, in his Mathematicall preface, and also in

in the 12. booke, whether you may haue recourse, yet notwithstanding I will saie a little thereof, whereby you may discern how farre it is possible to see a shippe vpon the Sea: as thus: if you be on the Sea in a shippe, so that there be but halfe a league betwene you and the other shippe, the water will be five inches and a halfe higher in the middle of the waie betwene both the ships, for that the water is equall in euerie place vnto the center of the earth, and then the water going by a crooked lyue, then to strike it by a right line, the middlemost lyne that should come from the center of the earth, shall be shorter then the other two lines comming from the center of the earth betwene the two shippes by five ynches and a halfe, and then it must needs be sayde, that the water is higher by the sayd five ynches and a halfe. And furthermore, if the two shippes were a league asunder, then the water by his circularnesse should be 22. ynches higher than the leuell in the middle betwene both the shippes.

Furthermore, if the two ships be two leaguess asunder, then the water shall be higher then the leuell in the middle betwene both the ships, by 88. ynches, which is 7. fote and 4. inches. If the two ships be 3. leagues the one from the other, then the water shall be higher than the leuell in the midwaie betwene both the ships, by 198. ynches, which is 16. fote and a halfe.

To knowe
how many
foote & inches
that the
water is
higher
than the
leuell or
the Sea,
betweene
two ships

Furthermore, if the two ships be foure leagues asunder, the water shall be higher than the leuell in the midwaie betwene both the shippes, by 252. inches, which is 29. fote and 4. inches. And furthermore, if the two ships were five leagues asunder, the water should be higher than the leuell of the midwaie betwene both the shippes, by 350. inches, which is 46. fote lacking two inches. Yet furthermore if the two shippes were six leagues asunder, the water should be higher than the leuell in the mid-

The Regiment for the Sea.

What a
ken is, and
the cause
vvhy you
may see a
ship far-
ther out
of the top
than vpon
y hatches.

die waie betwene them by 792.ynches, which is 66. fote. Furthermore also, if the two ships were 7. leagues asunder, the water should be higher than the leuell in the midwaie betwene both the ships by 1878. inches, & that is 90. fote, which is as farre and rather farther than it is possible to see any shippe vpon the Sea: Neither is it possible to see any land further, but such land as is verie high lande, which for the greatnesse of the height you may see it, wherefoze 6. leagues or 7. leagues is called a kenne. Now the circularnesse of the earth is the cause that you may see a shippe or land further out of the top, than vpon the hatches: Wherefoze it is a plaine case, that the earth and Sea is not flat, but circular, as is afore declared, &c.

¶ The 19. Chapter, is as touching the making of Plats or Cardes for the Sea, and not to paint their Cardes as they doo, but rather to supplie the vacant places with other necessarie matters: and also of three necessarie things contained in the Plats or Cardes, and their vses, which is the most necessarie thing in Nauigation,



Of the making of Plats or Cards, as touching Hydrographia, commonly called Sea cards, I meane to saie little therof: for that it is sufficiētly declared in the booke called the Art of Nauigation: Saying this, I woulde wish them that be makers of Plats and Cardes for the Sea, not to paint their compasses with so many coulours: neyther vpon the lande Sea cards, with so many flagges, for that it dooth rather hurt than but to vse good: although it may be sayd, they be so painted in vacant

cant places, those vacant places I woulde wishe them to furnish with these two matters in this order. First, in some vacant place wyth a Compasse there, to place against euerie point of the halfe of the Compasse, Letters, or some other figures or Charecters, then in like manner, (accoꝝding to that place where such a Moone maketh a full Sea) to make that Letter or Charecter at the haven, port, or place: As for ensample thus: I place A. at the East point. B. at the East and by South. C. at the East Southeast. D. at Southeast and by East, and so consequently to all the pointes vnto the West, then that being done, where it sheweth an East Moone, I place A. in the Plat or Carde, and where an East and by South Moone, I doe place B. in the Carde, and so forth, according to the place of the Moone that maketh a full Sea. And where it runneth halfe tide vnder other, to make some note vpon the Card in that place, &c.

This also is verie necessarie to be done, to furnish vpon all the vacant places of the Plat or Carde, to drawe the shape or fashion of euerie head land or high land alongst euerie Coast that is needfull to bee knowen, and at what point of the compasse the land is of that fashion: at howe farre off the lande riseth in that fashion: and so to make the fashion of the lande as often as the lande altereth the forme and fashion: and last of all, at what point of the Compasse the lande hath that shape or fashion: for being vppon one side, the lande riseth of one fashion, and on the other side of another forme or fashion.

Also being nere the lande, it will be in one fashion, and being farre off in another fashion (as is before declared in the 14. Chapter) for there is nothing more needfull and necessarie for a Sea-man than this: to knowe the lande when he seeth it, and there is no waie better to make him remember it, than to haue notes how the land doth rise vpon euerie side, & what greater inconuenience may

the vacāt
places,
w other
necessarie
mattu.

To draw
the shape
of the lād
in theyr
Cardes.

The Regiment for the Sea.

Great in-
firmities
by mista-
king any
place.

How ne-
cessarie a
thing the
Sea cards
bee.

3. necessa-
rie things
in the sea
cardes.

To know
how any
place doth
beare fro
you by
the Card.

may there growe by any meanes, that there maye by mistaking of a place: for it were twentie times better to bee thoroughly perfwaded, that he knoweth it not, than to thinke hee doth knowe it, not being that place. For whereas he doth thinke to prevent the daungers, he may willingly runne vpon the daungers, not knowen of him. Wherefore in my opinion they can doe no better than to furnish theyr vacant places in their Plats and Cards with this matter: for there can be nothing better. The vse of the Sea Cardes is most necessarie for Nauigation for long voyages: first, for that it sheweth you how one place beareth from another: secondly, the distaunce of any place howe farre the one is from the other. Of which the one is represented by the lines of the Compasse: the other by the scale or trunke of measure, if the plat be truly made. Thirdly, it sheweth you in what Latitude from the Equinoctiall or altitude of the Pole any place is in, by the line of degrees.

Nowe to direct your course through the Sea by the Card, to any place assigned, you must first looke by what point of the compasse it beareth from you, from the place you meane to set off from the lande, vnto the place you would first fall with. Which you shall know thus: seeke a line from the next compasse, vnto the place you meane to departe from, then open your Compasses vnto one of those lynes by your iudgement that falleth neare vnto your place assigned: and let the other foote of your Compasses stand iust at that place where your ship is, when you direct your course: that done, beare your handes forwarde even, and let the one end bee styll vpon the line to the which you did open your compasses, vntyll you come to your place assigned. But if it falleth short of the place assigned, then take the next lyne nearer vnto the place you departed from: when you haue so done, if your Compasses doe out-reach the place assigned, then take a
lyne

lyne further off from the place you doe meane to set off from : and so shall you see by what poynt of the Compasse the place assigned doth beare from you &c. If you would know how farre the place assigned is from you, set the one foote of the compasses vpon the place you depart from, and stretch out the other foot vnto the place assigned iust, that done (standing still vnremoued) set the foot to the scale or trunke of measure, and that wil shew you iustly how many leagues it is iust from y^e place of your departing vnto the place assigned. If y^e distance between the two places be more than the compasses will reach at once, then first set your compasses vnto the scale, opening the compasses vnto 100. leagues more or lesse, as your scale and compasses will giue you leaue at your discretion, after that set the one foote at the place of your departing, and the other foote of the Compasses right towarde the place assigned, as oftentimes as the distaunce betwene the two places doth require, and then (the compasses being opened vnto 100. leagues) you may conclude it to be so many 100. leagues vnto the place assigned, as the Compasses did shewe vnto you : but if there be any odd measure, then open your Compasses to that quantitie, and set that to the scale, and it will shewe you the iust content of that measure, more than so many 100. leagues &c. Furthermoze touching the third commoditie, which is to know what Latitude any place assigned hath : set one foote of the Compasses vpon the place assigned, and open the Compasses vnto the next East and West Lyne, then carrie that vnto the Lyne of degrees, keeping the foote of the Compasses vpon the East and West Lyne) it will shewe iustlye the number of Degrees that the Pole is aboue the Horizon. So of these three wayes, by the first is knowen by what poynt of the Compasse any place beareth from you. By the second is knowen how farre distance it is vnto any place assigned.

To know
how far
it is vnto
any place
by y^e cards.

To know
what La-
titude or
height of
the Pole
any place
hath by
the Card.

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assigned. And by the thirde is knowen in what height the Pole is, in any place assigned, &c. (Now this being knowen) you may with the more ease know how to attaine to come vnto the port or place assigned.

Things to be considered by the Master or Pilot of a shippe.
Yet furthermore there is to be considered in (directing the course of a ship to any place assigned) what impediments maye be by the way: as tides, currents, or the scantnesse of the winde, which maye put the shippe vnto the leewardes of his course, as also the surging of the Sea: and all this must be considered by the master and Pilot of the ship. Likewise also in long voyages, the winde may often shift vpon him, and sometime the wind may be such as he cannot lye his course: wherefore hee must keepe a perfecte account of the shippes waye, and consider to know what point the ship hath made her way good by. And at euery time that the winde doth shift, and the ship cannot lye her course, to note in y^e carde or plat in what place the ship may be: in hauing a speciall regarde vnto the waye of the ship, as touching the swiftnesse or slownesse that the shippe goeth: and if so be the weather be cleare eyther by night or day, to take y^e true Altitude of the Pole: for by that they maye correct the shippes waye, and giue a very neare gesse, how the place (assigned to goe vnto) both beare from them, as also how farre it is thether, sauing onely in the East and West course: and then they haue no other help but onely the very account of the shippes way.

They may correcte the shippes way by taking y^e height of the Pole.

And to correct their dead reckening by the Altitude of the Pole, they must do this: (especially if the shippe haue hadde often trauarfe by the meanes of contrarve wyndes, so that she could not lye her course,) consider vpon the carde or plat how long the ship hath made her way good, for so many points as the ship hath sayled by: then (if by the Altitude of the Pole the shippe hath gone more than the dead reckening did shew you) repaire vnto

to the lyne of degrees, and set the one foote of the Compasse vpon the degree & place of the height of the Pole, and the other vpon the next East and West lyne: that done, beare it vnto the place you suppose the ship to bee in, and then bring forwards with the other compasses, what poynt of the Compasse the shippe hath sayled by, and at the meeting of the two paire of compasses, make a note for the place that the shippe is in: from which place you may with your Compasses see, how the place assigned dooth beare, and also how farre off you be from the same.

Furthermore (if you finde by the height of the Pole that you are not so farre shot, as your reckoning didde shewe vnto you) you must pull backe so much from the poynt that the ship hath sayled by, as the height of the Pole dooth shewe vnto you by the order before rehearsed, &c.

Furthermore (as I haue declared vnto you in the 14. Chapter going before) to knowe how farre the land is off from you, knowing (as before) the distaunce betwene any two places, by setting the land wyth your Compasse, you may doe the lyke by your Card, as thus: you setting the two places with your compasse, do knowe that the two places bee so manye leagues asunder, then shall you repaire to the Carde, and according to the bearing of the two places by the points of the compasse, you (being thwart of one of these two places) shall repleve it with your Compasses vnto your scale: But so that in the Scale the leagues bee so small, you maye assigne twentie leagues to be but one league, and open the compasses vnto that proportion that the two places bee asunder, and the one of them doeth beare from the other: that done, open the Compasses againe from the center of the Compasse, vnto the place that you doe imagine to

To knowe how far that the land is off from you by sight of y land with your compasse, to doo it vpon the lande.

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be the land, & then reply it vnto the trunke of measure, and you shall see how many Leagues you be from the shore, and so forth. So that you may see that the plat or carde is one of the necessariest things that is to be vled in Nauigation, &c.

The 20. Chapter is of the Longitude and declination of 32. notable fixed starres, very necessarie for Nauigation, with tables of their shining, & at what point of your Compasse they doo both rise and set: and also Tables for euery moneth of the yeare, declaring at what houre and minute they be South, running from the first day of the moneth, to the fifteenth, & from the fifteenth to the last daye, and will continue these 100. yeares without much error.



If y^e Pole
be rayfed
more thā
30. or 60.
degrees, it
is to high
to be ob-
serued by
the crosse
stasse.

These
starres will

And furthermore, I doe thinke it conuenient for diuers considerations, to shewe the Longitude and declination of certain of the most notablest fixed stars y^e are nere vnto the Equinotiall, to the number of 32. of them, which are very necessarie for Nauigation in diuers respects, as this: if you be vnto the North parts where the North Pole is raised more than 50. or 60. degrees, then the North starre is too high to be obserued or taken with the Crosse stasse, (as I haue declared in the first Chapter) and it may chaunce so that in the day the Sunne is not to be scene at noone, and the these starres may serue your turne.

And furthermore they be very good for them that haue occasion to trauaile beyond the Equinotiall, where the North

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North Pole is vnder the Horizon, in vsing their declina-
tion as they doe the Sunnes declination in all pointes,
which doeth appeare in the 7.8.and 9. Chapters of this
booke. And furthermore they bee verie necessarie for Sea
faring men to know the houres of the night, both by their
beeing vpon the Meridian, and also by their rising and
setting you may know the true time of their rising and
setting in euerie Latitude by their declination from the
Equinoctiall, whether they decline to the South partes,
or North partes, as is declared by the declination of the
Sunne in the 11. Chapter.

serue be-
yonde the
equinoc-
tiall.

To know
the rising
& setting
of these
starres in
all places,
by the or-
der of the
xi. chapter

The or-
der of the
Table fo-
lowing.

And furthermore, by anye of these Starres you maye
trye the variation of your Compasse by night, &c. Now
shall followe the Table of all these Starres. The first
row of this Table containeth the names of the Starres.
The second, the signes, what they be in Longitude. The
third, the degrees in the signes. The fourth, the minutes
belonging therevnto. The fift, the degrees of declination.
The sixt, the odde minutes belonging therevnto. The
seuenth sheweth towarde what part they decline, by let-
ters, of which S. signifieth Septentrionall, or North de-
clination. M. signifieth Meridionall, or South de-
clination: as in the Table doth appeare.

The eight doth shew nothing but
the bignesse of the Starres.

Now followeth the
Table.

P.iii.

A Table

A Table of the fixed starres.

The names of the Starres.	Signes.	Longi. deg. mi	Declin. deg. mi	to what part they decline.	bignes of the starres.
Whales backe.	Aries	6. 6	12. 11	M	second bignesse.
Whales belly.	Aries	16. 2	12. 20	M	second bignesse.
Rammes hozne.	Aries	27. 42	17. 19	S	third bignesse.
Rammes head.	Taurus	1. 46	21. 16	S	third bignesse.
Balles eye.	Gemini	3. 42	15. 42	S	great starres.
Oriens left foote.	Gemini	10. 12	9. 14	M	a great starre
Oriens left shoulder.	Gemini	11. 26	4. 37	S	a starre of the
first Oriens girdle.	Gemini	16. 22	1. 19	M	second lyght both
Oriens right shoul.	Gemini	23. 6	6. 18	S	a great starre
Great Dogge.	Cancer	8. 40	15. 30	M	a verie great starre
Lesser Dogge.	Cancer	20. 10	6. 4	S	a great starre
Wrightest in Hidra	Leo	21. 2	4. 47	M	second bignesse
Lions necke.	Leo	23. 16	21. 59	S	second bignesse
Lions heart.	Leo	23. 32	14. 3	S	a great starre
Lions backe.	Virgo	5. 16	22. 30	S	second bignesse
Lions tayle.	Virgo	15. 32	16. 46	S	a great starre
Rauens head.	Libra	5. 6	19. 53	M	of the third bignes
Rauens wing.	Libra	9. 36	17. 8	M	both those
Virgins spike.	Libra	17. 42	4. 54	M	a great starre
twist Boots thighs	Libra	18. 6	22. 9	S	a great starre
South Balance.	Scorpi.	9. 2	13. 44	M	second bignesse
North Balance.	Scorpi.	13. 12	7. 33	M	second bignesse
Scorpions hart.	Sagit.	3. 42	24. 47	M	second bignesse
Hercules head.	Sagit.	8. 42	15. 20	S	third bignesse
Serpents head.	Sagit.	15. 52	14. 7	S	third bignesse
The Eagle.	Capric.	24. 51	7. 28	S	second bignesse
Dolphins taile.	Aquar.	8. 27	10. 1	S	third bignesse
Goates taile.	Aquar.	17. 22	14. 13	M	third bignesse
water pourers leg.	Pisces	2. 20	15. 52	M	third bignesse
Pegasus holder.	Pisces.	17. 4	13. 1	S	second bignesse
Pegasus legge.	Pisces.	23. 10	26. 30	S	second bignesse
Whales taile.	Pisces.	26. 21	21. 47	M	third bignesse

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The vse of this Table is this : when you haue taken the height of any of these Starres vpon the Meridian, then looke what declination the Starre hath from the Equinoctiall: if the Starre hath North declination, then subtract or take awaie the Starres declination from the height : if it hath South Declination, then adde or put vnto the height the Starres declination, & that will shew vnto you the height of the Equinoctiall, and then by the height of the Equinoctiall, the height of the Pole is known, as the 7. Chapter doth declare. And now I thinke it conuenient to make certaine Tables, to shew vnto you at what houre and time any of these Starres be vpon the Meridian, whereby they maye the better knowe these Starres. I will also shew vnto you how long anye of these Starres do shine or tarrie aboue the Horizon in this Latitude from the Equinoctiall of London, that is at 51. or 52. degrees. And also at what point of the compasse any of these Starres doe rise or set, which will serue this 100. yeares without much erroꝝ.

How to
vse y^e stars
declinati-
on, to
knowe the
height of
the Pole.

A Table to knowe the rising and setting of these Starres, by what point of the Compasse, and how many houres they bee aboue our Horizon, the Pole being raised 51. or 52. degrees

THE Whales back riseth East and by South, and vnto the Southwards : and shineth 10. houres & better. The Whales belly (in a manner) as the Whales backe. The Hammes horne riseth East North-east, and setteth West North-west: and shineth 15. houres. 16. minutes. The Hammes head riseth East North-east, & setteth West North-west: and shineth 16. houres 4. minutes. The Bulles eie riseth nere the East North-east, and setteth

The Regiment for the Sea.

setteth néere the West Northwest: and shineth 15. houres
2. minutes.

The Orions lesse foote riseth néere the East and by
South, and setteth néere the West and by South: & shi-
neth 10. houres and 6. minutes.

The Orions left shoulder riseth East & to the North-
wards, and setteth West and to the Northwardes: and
shineth 12. houres. 45. minutes.

The first in Orions girdle doth rise a little to the South-
wards of the East, & setteth a little to the Southwards of
the West, and shineth 11. houres. 46. minutes.

Orions right shoulder riseth East, and vnto the North-
wardes, and setteth West and vnto the Northwards: and
shineth 13. houres. 12. minutes.

The great dogge riseth East Southeast, and setteth
West Southwest, and shineth 9. houres.

The lesser Dog riseth East & vnto the Northwards,
and setteth West, and vnto the Northwards: and shineth
13. houres. 10. minutes.

The brightest in Hydra riseth East & vnto the South-
ward, and setteth West and vnto the Southwards: and
shineth 11. houres and 7. minutes.

The Lyons necke riseth East Northeast, and to the
Northwards, and setteth West Northwest and to the
Northwardes, and shineth 16. houres 16. minutes.

The Lions heart riseth néere the East Northeast, and
setteth néere the West Northwest: and shineth 14. hours. 50
minutes.

The Lyons backe riseth néere the Northeast and by
East, and setteth néere the Northwest and by West: & shi-
neth 16. houres. 26. minutes.

The Lyons tayle riseth néere the East Northeast, and
setteth néere the West Northwest: and shineth 15. houres
12. minutes.

The Rauens head ryseth néere the East Southeast,
and

the regiment for the Sea.

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and setteth nere the West Southwest, and shi-
neth 12. minutes.

The Ravens wing riseth nere the East Southeast,
and setteth nere the West Southwest, and shi-
neth 8. houres 50. minutes.

The Virgins spike riseth East & to the Southwards,
and setteth West, and to the Southwards, and shi-
neth 8. minutes.

Bottomes Boote, riseth nere the Northeast,
and by East, and setteth nere the Northwest & by West,
and shi-
neth 16. houres 20. minutes.

The South Ballance riseth nere the East South-
east, and setteth nere the West Southwest, & shi-
neth 9. houres 36. minutes.

The North Ballance riseth nere the East, and by
South, and setteth nere the West & by South, and shi-
neth 10. houres. 38. minutes.

The Scorpions heart riseth nere the Southeast and
by East, and setteth nere the Southwest and by West,
and shi-
neth 7. houres 5. minutes.

Heracles head riseth nere the East Northeast, and
setteth nere the West Northwest, & shi-
neth 14. houres
56. minutes.

The Serpents head riseth nere the East Northeast, &
setteth nere the West Northwest, & shi-
neth 14. houres,
40. minutes.

The Eagle riseth nere the East and by North, and
setteth nere the West and by North: and shi-
neth 13.
houres. 24. minutes.

The Dolphines taile riseth East and by North, and
setteth West and by North, and shi-
neth 15. houres. 57. mi-
nutes.

The Goates taile riseth nere y East Southeast, and
setteth West Southwest, & shi-
neth 9. houres 20. minutes

The water pourers leg, riseth nere y east southeast,
and

the regiment for the Sea.

The 11.
Chap. wil
shewe
how lōg
anye of
these starrs
will shine
in all pla-
ces.

and setteth West Southwest, and thinieth 8. houres 54. minutes.

Pegasus shoulders riseth nere the East Southeast, & setteth nere the West Northwest & thinieth 14. houres 32. minutes.

Pegasus leg riseth nere Southeast, and setteth nere Northwest, and thinieth 17. houres 6. minutes.

The Whales taylor riseth East Southeast, and setteth West Southwest, and thinieth 7. houres 48. minutes.

Furthermore if you desire to know the time of any of these starres being above the Horizon in all Latitudes, then repairs to the 11. Chapter, so you shall know it ther by their declination: euen by the same order that you know the Sunnes being above the horizon, by the Sunns Declination.



These

A Table of the fixed starres.

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These stars being south frō the Ianua. frō the Febru. frō the Febru. frō the
first day of Ianuari vnto the 15. 15. to the last. 15. vnto the 15. 15. to the last.

1	Whales backe.	5.20	E	1	4.20	DA	1	3.20	DA	1	2.20.	DA
2	Whales belly.	5.54	E	2	4.54	DA	2	3.54.	DA	2	2.54.	DA
3	Kammes horne.	6.28	E	3	5.28	E	3	4.28.	DA	3	3.28.	DA
4	Kammes head.	6.45	E	4	5.45	E	4	4.45.	DA	4	3.45.	DA
5	Bulles eye.	8.52	E	5	7.52	E	5	6.52.	E	5	5.52.	DA
6	Orions left scote.	9.23	E	6	8.23	E	6	7.23	E	6	6.23.	E
7	Orions left shoulder.	9.28	E	7	8.28	E	7	7.28	E	7	6.28	E
8	first Orions girle.	9.50	E	8	8.50	E	8	7.50	E	8	6.50	E
9	Orions right shoul.	10.12	E	9	9.12.	E	9	8.12.	E	9	7.12.	E
10	Great Dogge.	11.4	E	10	10.4.	E	10	9.4.	E	10	8.4	E
11	Lesser Dogge.	12.0	E	11	11.0	E	11	10.0.	E	11	9.0	E
12	Brightest in Hidra	12.4	M	12	11.4	E	12	10.4.	E	12	9.4.	E
13	Lions necke.	2.12	M	13	1.12	M	13	12.12	M	13	11.12.	E
14	Lions heart.	2.13	M	14	1.13	M	14	12.13	M	14	11.13.	E
15	Lions backe.	3.0	M	15	2.0	M	15	1.0.	M	15	12.0.	
16	Lions tayle.	3.42	M	16	2.42	M	16	1.42	M	16	1.42	M
17	Kauens head.	5.2	M	17	4.2	M	17	3.2.	M	17	2.2.	M
18	Kauens wing.	5.19	M	18	4.19.	M	18	3.19	M	18	2.19.	M
19	Virgins spike.	5.51	M	19	4.51	M	19	3.51.	M	19	2.51.	M
20	twirt Boos thighs	5.56	M	20	4.56	M	20	3.56.	M	20	2.56.	M
21	South Balance.	7.16	M	21	6.16	M	21	5.16.	M	21	4.56.	M
22	North Balance.	7.33	MD	22	6.33	M	22	5.53.	M	22	4.33.	M
23	Scorpions hart.	8.54	MD	23	7.54	MD	23	6.54.	M	23	5.54.	M
24	Hercules head.	9.14	MD	24	8.14	MD	24	7.14	MD	24	6.14	M
25	Serpents head.	9.41	MD	25	8.41	MD	25	7.41	MD	25	6.41.	M
26	The Eagle.	12.19	DA	26	11.19	MD	26	10.19	MD	26	9.19.	MD
27	Dolphins taile.	1.12.	DA	27	12.12.	DA	27	11.12.	MD	27	10.12.	MD
28	Goates taile.	1.48	DA	28	12.48.	DA	28	11.48.	MD	28	10.48	MD
29	water pourers leg.	2.48	DA	29	1.48	DA	29	12.48	DA	29	11.48	MD
30	Pegasus sholder.	3.47	DA	30	2.47	DA	30	1.47.	DA	30	12.47	DA
31	Pegasus legge.	4.12	DA	31	3.12	DA	31	2.12.	DA	31	1.12.	DA
32	Whales taile.	4.24	DA	32	3.24	DA	32	2.24.	DA	32	1.24	DA

Qij.

March

A Table of the fixed starres.

March frō the first to the 15. March frō the 15. to the last. April frō the first to the 15. April frō the 15. to the last. May frō the first to the 15.

1	1.20. DA	1	11.20. DA	1	11.20. MD	1	10.20. MD	1	9.20. MD
2	1.54. DA	2	12.54. DA	2	11.54. MD	2	10.54. MD	2	9.54. MD
3	2.28. DA	3	1.28. DA	3	12.28. DA	3	11.28. MD	3	10.28. MD
4	2.45. DA	4	1.45. DA	4	12.45. DA	4	11.45. MD	4	10.45. MD
5	4.52. DA	5	3.52. DA	5	2.52. DA	5	1.52. DA	5	12.52. DA
6	5.23. DA	6	4.23. DA	6	3.23. DA	6	2.23. DA	6	1.23. DA
7	5.28. DA	7	4.28. DA	7	3.28. DA	7	2.28. DA	7	1.28. DA
8	5.50. DA	8	4.50. DA	8	3.50. DA	8	2.50. DA	8	1.50. DA
9	6.12. E	9	5.12. DA	9	4.12. DA	9	3.12. DA	9	2.12. DA
10	7.4. E	10	6.4. DA	10	5.4. DA	10	4.4. DA	10	3.4. DA
11	8.0. E	11	7.0. E	11	6.0. DA	11	5.0. DA	11	4.0. DA
12	8.4. E	12	7.4. E	12	6.4. DA	12	5.4. DA	12	4.4. DA
13	10.12. E	13	9.12. E	13	8.12. E	13	7.12. DA	13	6.12. DA
14	10.13. E	14	9.13. E	14	8.13. E	14	7.13. DA	14	6.13. DA
15	11.0. E	15	10.0. E	15	9.0. E	15	8.0. E	15	7.0. DA
16	11.42. E	16	10.42. E	16	9.42. E	16	8.42. E	16	7.42. DA
17	1.2. M	17	12.2. M	17	11.2. E	17	10.2. E	17	9.2. E
18	1.19. M	18	12.19. M	18	11.19. E	18	10.19. E	18	9.19. E
19	1.51. M	19	12.51. M	19	11.51. E	19	10.51. E	19	9.51. E
20	1.56. M	20	12.56. M	20	11.56. E	20	10.56. E	20	9.56. E
21	3.16. M	21	2.16. M	21	1.16. M	21	12.16. M	21	11.16. E
22	3.33. M	22	2.33. M	22	1.33. M	22	12.33. M	22	11.33. E
23	4.54. M	23	3.54. M	23	2.54. M	23	1.54. M	23	12.54. M
24	5.14. M	24	4.14. M	24	3.14. M	24	2.14. M	24	1.14. M
25	5.41. M	25	4.41. M	25	3.41. M	25	1.41. M	25	3.41. M
26	8.19. MD	26	7.19. MD	26	6.19. MD	26	5.19. MD	26	4.19. M
27	9.12. MD	27	8.12. MD	27	7.12. MD	27	6.12. MD	27	5.12. MD
28	9.48. MD	28	8.48. MD	28	7.48. MD	28	6.48. MD	28	5.48. MD
29	10.48. MD	29	9.48. MD	29	8.48. MD	29	7.48. MD	29	6.48. MD
30	11.47. MD	30	10.47. MD	30	9.47. MD	30	8.47. MD	30	7.47. MD
31	12.12. DA	31	11.22. MD	31	10.12. MD	31	9.12. MD	31	8.12. MD
32	12.24. DA	32	11.24. MD	32	10.24. MD	32	9.24. MD	32	8.24. MD

May

A Table of the fixed starres.

May from the 15. to the last. June from the first to the 15. June from the 15. to the last July from the first to the 15. July from the 15. to the last.

1	8.20. MD 1	7.20. MD 1	6.20. MD 1	5.20 MD 1	4.20. M
2	8.54. MD 2	7.54. MD 2	6.54. MD 2	5.54 MD 2	4.54. MD
3	9.28. MD 3	8.28. MD 3	7.28 MD 3	6.28 MD 3	5.28 MD
4	9.45. MD 4	8.45. MD 4	7.45 MD 4	6.45 MD 4	5.45 MD
5	11.52. MD 5	10.52. MD 5	9.52. MD 5	8.52 MD 5	7.52 MD
6	12.23. DA 6	11.23. MD 6	10.23. MD 6	9.23 MD 6	8.23 MD
7	12.28. DA 7	11.28. MD 7	10.28. MD 7	9.28 MD 7	8.28 MD
8	12.50. DA 8	11.50. MD 8	10.50. MD 8	9.50 MD 8	8.50 MD
9	1.12. DA 9	12.12. DA 9	11.12 MD 9	10.12 MD 9	9.12 MD
10	2.4. DA 10	1.4. DA 10	12.4 DA 10	11.4 MD 10	10.4 ME
11	3.0. DA 11	2.0. DA 11	1.0 DA 11	12.0 11	11.0. ME
12	3.4. DA 12	2.4. DA 12	1.4 DA 12	12.4 DA 12	11.4 ME
13	5.12. DA 13	4.12. DA 13	3.12 DA 13	2.12 DA 13	1.12 DA
14	5.13. DA 14	4.13. DA 14	3.13 DA 14	2.13 DA 14	1.13 DA
15	6.0. DA 15	5.0. DA 15	4.0 DA 15	3.0 DA 15	2.0 DA
16	6.42. DA 16	5.42. DA 16	4.42 DA 16	3.42 DA 16	2.42 DA
17	8.2. DA 17	7.2. DA 17	6.2 DA 17	5.2 DA 17	4.2. DA
18	8.19. DA 18	7.19. DA 18	6.19 DA 18	5.19 DA 18	4.19 DA
19	8.51. DA 19	7.51. DA 19	6.51 DA 19	5.51 DA 19	4.51 DA
20	8.56. DA 20	7.56. DA 20	6.56 DA 20	5.56 DA 20	4.56 DA
21	10.16. E 21	9.16. DA 21	8.16 DA 21	7.16 DA 21	6.16 D.
22	10.33. E 22	9.33. DA 22	8.33 DA 22	7.33 DA 22	6.33 D.
23	11.54. E 23	10.54. E 23	9.54 DA 23	8.54 DA 23	7.54 D.
24	12.14. M 24	11.14. E 24	10.14. E 24	9.14 E 24	8.14
25	12.41. M 25	11.41. E 25	10.41 E 25	9.41 E 25	8.41
26	3.19. M 26	2.19. M 26	1.19 E 26	12.19 M 26	11.19
27	4.12. MD 27	3.12. M 27	2.12 M 27	1.12. M 27	12.12 I
28	4.48. MD 28	3.48. M 28	2.48 M 28	1.48 M 28	12.48 I
29	5.48. MD 29	4.48. MD 29	3.48. M 29	2.48 M 29	1.48 I
30	6.47. MD 30	5.41. MD 30	4.47. MD 30	3.47 M 30	2.47 I
31	7.12. MD 31	6.12. MD 31	5.12. MD 31	4.12 MD 31	3.12
32	7.24 MD 32	6.24 MD 32	5.24 MD 32	4.24 MD 32	3.24.

Q.iii.

August.

A Table of the fixed starres.

August frō the first to the 15. | August frō the 15. to the last. | Septēb. frō the first to the 15. | Septēb. frō the 15. to the last. | Octo. from the first to the last.

1	3.20.	M	1	2.20	M	1	1.20	M	1	12.20	M	1	11.20.	E
2	3.54.	M	2	2.54	M	2	1.54	M	2	12.54.	M	2	11.54.	E
3	4.28.	M	3	3.28	M	3	2.28	M	3	1.28	M	3	12.28.	M
4	3.45.	MD	4	3.45	M	4	2.45	M	4	1.45	M	4	12.45	M
5	6.52.	MD	5	5.52	MD	5	4.52	M	5	3.52	M	5	2.52	M
6	7.23.	MD	6	6.23	MD	6	5.23	M	6	4.23	M	6	3.23	M
7	7.28.	MD	7	6.28	MD	7	5.28	M	7	4.28	M	7	3.28	M
8	7.50.	MD	8	6.50	MD	8	5.50	MD	8	4.50	M	8	3.50	M
9	8.12.	MD	9	7.12	MD	9	6.12	MD	9	5.12	M	9	4.12	M
10	9.4.	MD	10	8.4	MD	10	7.4	MD	10	6.4	MD	10	5.4	M
11	10.0.	MD	11	9.0	MD	11	8.0	MD	11	7.0	MD	11	6.0	M
12	10.4.	MD	12	9.4	MD	12	8.4	MD	12	7.4	MD	12	6.4	M
13	12.12.	DA	13	11.12	MD	13	10.12	MD	13	9.12.	MD	13	8.12	MD
14	12.13	DA	14	11.13	MD	14	10.13	MD	14	9.13	MD	14	8.13	MD
15	1.0	DA	15	12.0		15	11.0	MD	15	10.0	MD	15	9.0	MD
16	1.42	DA	16	12.42	DA	16	11.42	MD	16	10.42	MD	16	9.42	MD
17	3.2	DA	17	2.2	DA	17	1.2	DA	17	12.2	DA	17	11.2	MD
18	3.19	DA	18	2.19	DA	18	1.19	DA	18	12.19	DA	18	11.19	MD
19	3.51	DA	19	2.51	DA	19	1.51	DA	19	12.51	DA	19	11.51	MD
20	3.56	DA	20	2.56	DA	20	1.56	DA	20	12.56	DA	20	11.56	MD
21	5.16	DA	21	4.16	DA	21	3.16	DA	21	2.16	DA	21	1.16	DA
22	5.33	DA	22	4.33	DA	22	3.33	DA	22	2.33	DA	22	1.33	DA
23	6.54	DA	23	5.54	DA	23	4.54	DA	23	3.54	DA	23	2.54	DA
24	7.14	DA	24	6.14	DA	24	5.14	DA	24	4.14	DA	24	3.14	DA
25	7.41	DA	25	6.41	DA	25	5.41	DA	25	4.41	DA	25	3.41	DA
26	10.19	E	26	9.19	E	26	8.19	E	26	7.19	E	26	6.19	E
27	11.12	E	27	10.12	E	27	9.12	E	27	8.12	E	27	7.12	E
28	11.48	E	28	10.48	E	28	9.48	E	28	8.48	E	28	7.48	E
29	12.48	M	29	11.48	E	29	10.48	E	29	9.48	E	29	8.48	E
30	1.47.	M	30	12.47	E	30	11.47	M	30	10.47	E	30	9.47	E
31	2.12.	M	31	1.12	M	31	12.12	M	31	11.12	E	31	10.12	E
32	2.24	M	32	1.24	M	32	12.24	M	32	11.24	E	32	10.24.	E

October.

A Table of the fixed starres.

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Octob. frō the 15. to the last. Nouēb. frō the 15. to the last. Nouēb. frō the 15. to the last. Decēb. frō the 15. to the last. Decēb. frō the 15. to the last.

1	10.20	E ₁	9.20	E ₁	8.20	E ₁	7.20	E ₁	6.20	E
2	14.54	E ₂	9.54	E ₂	8.54	E ₂	7.54	E ₂	6.54	E
3	11.28	E ₃	10.28	E ₃	9.28	E ₃	8.28	E ₃	7.28	E
4	11.45	E ₄	10.45	E ₄	9.45	E ₄	8.45	E ₄	7.45	E
5	1.52	M ₅	12.52	M ₅	11.52	E ₅	10.52	E ₅	9.52	E
6	2.23	M ₆	1.23	M ₆	12.23	M ₆	11.23	E ₆	10.23	E
7	2.28	M ₇	1.28	M ₇	12.28	M ₇	11.28	E ₇	10.28	E
8	2.50	M ₈	1.50	M ₈	12.50	M ₈	11.50	E ₈	10.50	E
9	3.12	M ₉	2.12	M ₉	1.12	M ₉	12.12	M ₉	11.12	E
10	4.4	M ₁₀	3.4	M ₁₀	2.4	M ₁₀	1.4	M ₁₀	12.4	M
11	5.0	M ₁₁	4.0	M ₁₁	3.0	M ₁₁	2.0	M ₁₁	1.0	M
12	5.4	M ₁₂	4.4	M ₁₂	3.4	M ₁₂	2.4	M ₁₂	1.4	M
13	7.12	MD ₁₃	6.12	M ₁₃	5.12	M ₁₃	4.12	M ₁₃	3.12	M
14	7.13	MD ₁₄	6.13	M ₁₄	5.13	M ₁₄	4.13	M ₁₄	3.13	M
15	8.0	MD ₁₅	7.0	M ₁₅	6.0	M ₁₅	4.0	M ₁₅	4.0	M
16	8.42	DM ₁₆	7.42	MD ₁₆	6.42	M ₁₆	5.42	M ₁₆	4.42	M
17	10.2	MD ₁₇	9.2	DM ₁₇	8.2	MD ₁₇	7.2	M ₁₇	6.2	M
18	10.19	MD ₁₈	9.19	MD ₁₈	8.19	MD ₁₈	7.19	M ₁₈	6.19	M
19	10.51	MD ₁₉	9.51	MD ₁₉	8.51	MD ₁₉	7.51	MD ₁₉	6.51	M
20	10.56	MD ₂₀	9.56	MD ₂₀	8.56	MD ₂₀	7.56	MD ₂₀	6.56	M
21	12.16	DA ₂₁	11.16	MD ₂₁	10.16	MD ₂₁	9.16	MD ₂₁	8.16	MD
22	12.33	DA ₂₂	11.33	MD ₂₂	10.33	MD ₂₂	9.33	MD ₂₂	8.33	MD
23	1.54	DA ₂₃	12.54	DA ₂₃	11.54	MD ₂₃	10.54	MD ₂₃	9.54	AD
24	2.14	DA ₂₄	1.14	DA ₂₄	12.14	DA ₂₄	11.14	MD ₂₄	10.14	MD
25	2.41	DA ₂₅	1.41	DA ₂₅	12.41	DA ₂₅	11.41	MD ₂₅	10.41	MD
26	5.19	DA ₂₆	4.19	DA ₂₆	3.19	DA ₂₆	2.19	DA ₂₆	1.19	DA
27	6.12	E ₂₇	5.12	E ₂₇	4.12	E ₂₇	3.12	DA ₂₇	2.12	DA
28	6.48	E ₂₈	5.48	E ₂₈	4.48	E ₂₈	3.48	DA ₂₈	2.48	DA
29	7.48	E ₂₉	6.48	E ₂₉	5.48	E ₂₉	4.48	E ₂₉	3.48	DA
30	8.47	E ₃₀	7.47	E ₃₀	6.47	E ₃₀	5.47	E ₃₀	4.47	E
31	9.12	E ₃₁	8.12	E ₃₁	7.12	E ₃₁	6.12	E ₃₁	5.12	E
32	9.24	E ₃₂	8.24	E ₃₂	7.24	E ₃₂	6.24	E ₃₂	5.24	E

Now

The regiment for the Sea.

The signi-
fication
of the let-
ters in the
table.

Now this Table serueth for every month in the year
(being exactly calculated) the time of their being
South, or touching your Meridian, (or as some terme it)
Ponestead, seruing verie well the Sea-men to take &
height of them with their instrumentes vppon the Sea,
referring it vnto the Table of Declination that goeth
before: The first is the houres, the seconde the minutes,
the third bee the letters that shewe you whether they bee
South by day or by night, in the euening or morning in
the forenoone or afternoone, of which the Letter E. doth
signifie Euening, the Letter M. signifieth morning, the
letters DM. signifieth day in the morning, and the letters
DA. signifieth daie in the afternoone (as I sayde before)
the verie houre and minute of theyr being South. Now
you see that I haue put too their being South in the daie,
as well as in the night, to the intent to knowe the houre
of the night, as well by theyr setting, as also by your
Compasse, which I shewed you in the first Chapter or
Rule, namely to bring your 32. pointes, into 24. houres:
And in lyke manner, in the fourth Chapter by shyning
of the Moone to diuide the shyning into equall partes,
then those partes being equally diuided with the houre
and minutes, and the time before theyr being South,
put together the halfe that shyneth, and that sheweth the
iust rising of the starres: and the other time of their shi-
ning after their being South sheweth their setting (as
I declared in the rule of the shyning of the Moone.) Now
you, seeing the Table runneth from the first daie of e-
uerie moneth to the 15. from the 15. to the last daie, must
consider, (if you will knowe the exact time betwene the
first daie or the 15. daie, and betwixt the 15. daie, and the
last) to doe this, looke howe manye dayes of the moneth
is past, eyther from the first daie or 15. daie, and pull foure
minutes from that number: for so manye dayes as is
past, for euery daie that shall shew you the true time of
their

the regiment for the Sea.

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their being South. That knowen, you shall doe (as is
aforesaid) for their rising and setting.

¶ The 21. Chapter sheweth you the making of a generall
Instrument, to know the houre of the day by,
throughout all the world.



NOW for the making of your Instru-
ments for the Sea, with their uses, you
shall repaire to the booke of Nauigati-
on, made by Martin Curtise a Spaniard,
imprinted by M. Iugge, late Printer to
the Quenes Maiestie: Else I woulde
haue shewed you the making of diuers Instruments, as
also the making of the Equinotiall diall with his vse,
which is very profitable to knowe the houre of the daye
by, in all Latitudes through the whole world, for your
Compass is not to know the houre of y^e day by in Sum-
mer, neither in the Morning nor Evening, neither can
you know when the Moone is East or West, she hauing
North declination, as being in the signe of Taurus, Ge-
mini, Cancer or Leo, because your compass standeth flat
as doth your Horizon. Wherefore it is very good for Sea-
men to vse the Equinotiall dialls, for that it sheweth
them the true houre of the day in all Latitudes, and al-
so the Moone doth giue a true shadow in that diall in
all latitudes, for I doe know that Seamen are very ma-
ny times deceiued where it doth flow an East & West
Moone, or any Point betwene the Southeast & North-
east. Because in setting the Moone with their Compass
(being in the North signes,) she seemeth to be East by
the Compass, when she is nere the East Southeast in
her course: and in like manner when the Moone seemeth
West by the Compass, she shall be a little more than
West Southwest in her course. Which is a very peril-

The Sun
& Moone
do giue a
full shad-
dowe by
the Com-
pass.
The Equi-
notiall
diall gy-
ueth a
true sha-
dowe all
the world
ouer.

R.

lous

The regiment for the Sea.

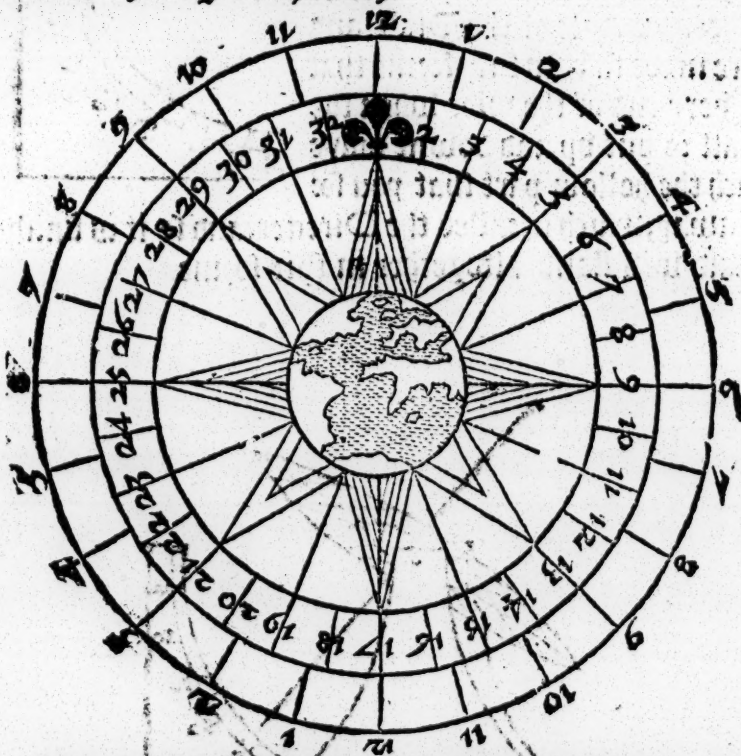
A perillous matter vnto them that should put into a tide, harbor, or haven, wher he knoweth ther is water inough for him, if that he doth come at a full sea, and then by the error of y^e Moones shadow of y^e compasse he is deceiued: & when he findeth y^e error, he thinketh y^e the cause therof cometh by y^e occasion of some storme of winde y^e is like to follow, inputing vnto it, y^e the tide doth not keep his course, wheras y^e very cause groweth by no other means, but of receiuing a false shadow by y^e Horizontal compasse: & especially if y^e Moone be nere her greatest declination vnto y^e North parts, y^e is in y^e signe of Gemini & Cancer. And also y^e effect is most preferred, if y^e Dragons head be in y^e beginning of y^e signe of Aries: for y^e then if y^e Moone be in y^e beginning of Cancer, she shal haue 5. degrees more in declination from y^e equinotial, then y^e Sun shal haue at their greatest declination vnto y^e North parts. So y^e reseruing y^e Moones paralel, which is according vnto the latitude of any place y^e the Moone shal be declined 28. degrees & a halfe vnto y^e North part of y^e equinotial: so that for auoyding of these infirmities, I wold wish the to vse the Equinotial dials. And furthermore, I do think y^e the equinotial dials be not bled amogst our mariners here in England, for y^e the charges is so much in y^e making of them, & yet it serueth no other turn but to know y^e houre of y^e day, & to shew y^e true shadow of y^e Moone. I haue not knowen the bled by any English master or pilot, but only by one man, which person had not it for y^e proper vse therof, but rather had it to say, that he had such an instrument as no English man had y^e like, & to brag y^e he had such an instrument, y^e he could do great feats therewith in going of long voyages, &c. I wold haue no man offended wth me. I know y^e nature & qualitie of some that take charge, they will haue instruments & other things ther vnto appertaining, & yet they theselues do not know the vse of the, yet they will seme to be cunning, & that they need

The
Moone
may de-
cline 28.
degrees
& a halfe
from the
Equinoc-
tiall.

Of men
that vvill
haue In-
struments

need no instructions of any mā, for y they know al things, & knowv
 & yet in respect know nothing. (But notwithstanding) I not y vse
 wold with the y be seafaring mē, to vse theselues to y of them.
 Equinoctial diall, for y they do serue 2. notable turnes, as
 wel at home in these our chānels, as also in lōg voyages,
 they may make the w a very easie charge: for whereas
 in y Art of Navigatiō it is shewed how to make the in
 brasse, they may make the w wood in this māner, take a
 pece of boards end of 6 inches broad, more or lesse at your
 discretiō, & halfe an inch in thicknes, then hauing cut it
 round and plained it smooth, you may either graue in
 it the 32. points of the compasse, or els paint them vpon
 it, with some colours, with the 24. houres, vpon both the
 sides as this figure sheweth.

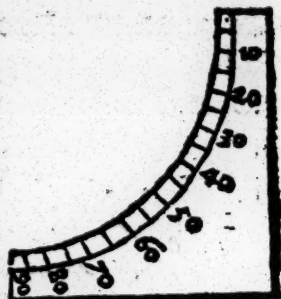
An easie
 vvaye to
 make an
 Equinoc-
 tiall Diall
 vvith litle
 charge.



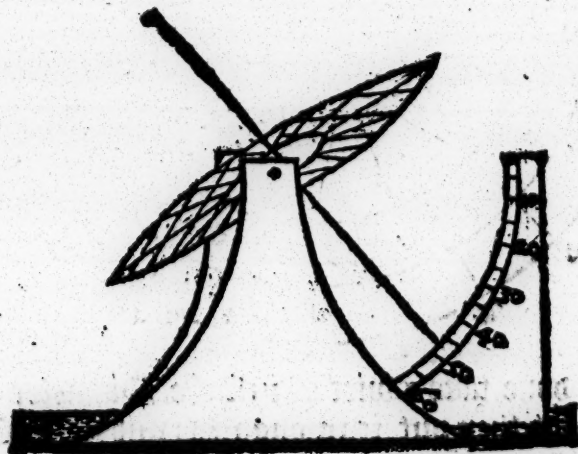
That done, take a wier of iust the Diameter of the
 Instrument, then put it through the middle or Center
 of the Instrument, then make it fast, that the one end be
 R.y. halfe

The regiment for the Sea.

halfe way thorough on the one side, and the other halfe on the other side: this done, make a frame with three peeces of boards endes, to hang the Diall or Instrument vpon, with one pin on the East poynt, and an other on the West poynt: then take an other pece of boards end being square, and with a paire of Compasses strike a quarter of a Circle, of iust the bignesse of the quarter of the Diall, and cut all that away, and then the rest of the square that is lefte (at the edge of the quarter of the Circle) deuide into 90. equall partes, marking it thus, 10. 20. 30. 40. 50. 60. 70. 80. 90. As in this forme: last of all, let this be placed in the middle of y^e frame so that 90. may stand right vnder the very middle of the Diall, and there made fast, in such forme that the very end of the wier when the Diall is put vp and downe maye touch the hollow part that you see cut away, which is called the Director, and so it is finished, and will stand altogether in this forme.



The Equi
noctiall
Diall.



The Regiment for the Sea.

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The vse of this Diall is most necessarie in a ship, for that you haue occasions to transport your selues into all the Climates. And to know the true houre of the day, doe this: Set this diall by your Compasse, (the director vnto the Southwards) and then (you knowing how high the Pole is aboue the Horizon) set the end of the wyre right against y degree, in the director, and the other end of the wire will point iust vnto the Pole, then loke what shadowe the wyre doth giue by the Sunne, that is the true houre of the daie. In like manner you may know y true houre of the night by the Moones shadowe, and also the Moone will giue a true shadow of her place, &c.

¶ The 22. Chapter treateth of the soundings, comming from any place out of the Occident Sea, to seeke Vshant or the Lizard, and so all alongst, till you come to the coast of Flaunders: with other necessarie matters to bee knowen to them that be Channellers, that doth occupie or deale amongst sands, banks, or such other like.



Because it is necessarie to bee had in memorie, for that it is a dangerous place to hit or fall with, to enter into the ſtreue, comming homewards out of Spaine or Portugall, or from Barbarie, or anye other place from the Southwards, a ship y commeth fro any such place to seeke the Ile of Vshant, or the Lizard, in this roote of sounding of a 100, or 90. fadames shall finde big soundings, and shall be nere about to the seames. In the roote of 80. fadames you shall finde cockle shells & dents in the fallow of the lead: & in this sounding hold on your course to y North, till you change sounding, then if you be at 60. or 64. fadame, you shall finde small sand & Wathey ground, and shall be nere the

The sounding nere vnto Vshant and the Lizard.

It.ij.

coast

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coast of Wihant. If you haue time and daie, goe seeke it in the Northeast, and you shall be about 10. leagues from the Ile. If you come making your course about Wase freed, you shall finde course sand, redde and browne; and you shall haue sounding at 40. fadames: if you bee towards the banke of Silley, you shall haue soundinges at 86.02 90. fadame, & you shall finde in the tallow stonie ground, and shall bee well shot towards the banke of Silley. When you bee at 80. fadame, you shall finde small black sand, and shall be well towards the Lizard. When you bee at 60.02 64. fadame, you shall finde white sand, and white softe woymes, and shall bee verie nigh to the Lizard. Betwene the Cape of Cornewall and Wihant amide the channell you shall finde 70. fadame and neere inough. Betwene Dodmon and the Foyn, in the channell, you shall haue 40.02 50. fadame. If you bee thwart of Plimmouth or the Start, you shall finde streamie ground and dents in the tallow and soundings 41.02 42. fadames. At the comming from Portland you shall haue 35. fadames, and small shingles. And when you bee nigh to Portlande. 30. fadames, and stonies like beanes, and this sounding will last till S. Alduin, and in the sayde sounding you shall finde white stonies lyke broken Aules, & other that be bigger, & then you shall be thwart of S. Aldam or of the Ile of Wight. Two or 3. leagues from the Ile of Wight, you shall finde 25. fadame, with dents and clefts in the tallow like small thys, two or thre leagues from the Cal kets, you shall finde 40. fadame, & big stonies ragged & black. Betwene the Ile of Wight and the Hag, the deepest is but 35.02 40 fadame. Betwene the Ile of Wight & Lantargat, the deepest is but 25.02 30. fadame. Betwene Beachy & the Ile of Wight a league from the land, you shall finde 38. fadame, and Poppel as bigge as Beanes. Betwene Fairely and the water of Summe in the deepest, but

The sound-
ing in
the chan-
nell.

The Regiment for the Sea.

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25.fadame . Betwæne Follstone and Bollayne , is a
banke that is called Kippe rappe:and lyeth in the midde
way betwæne Dickardie and England, and hard aboard
by it, is 26. or 27.fadame . In the straight of Calyce is
30.fadame, in the Roade of Calice is 16.fadame . And
alongst the coast of Flaunders is but 20.fadame , the
deepest. Thus much haue I said for the enterance of the
Sleeue, to come to the Riuer of Thames , and in the en-
teraunce in the midwaie betwæne Vshant and Lizard,
the Pole Articke is eleuated 50 degrees and a halfe, and
the Equinotiall is lifted aboue the Horizon 39.degrees
and a halfe . And furthermore, for them that are Chan-
nellers and occupiers amongst sandes and bankes, and
such other lyke , they must haue consideration of these
things following . As this : (first if you know howe the
Channell doth lie right betwæne anye two Sands : you
must view the lande to take some markes of it , in this
manner to bee a leading marke . And that you shall doe
thus : looke some thing that standeth farre into the land,
that you may knowe it well, bæing right open with the
Channell of the Sandes, then take an other marke nere
vnto the Waters side, and the one to bee ryght agaynst
the other, when that you be in the middle of the Chan-
nell: And then you knowing these two markes well,
they will be leading markes vnto you for euer to keepe
that Channell . And then furthermore, if it doth so hap-
pen that the Channell doth turne to keepe another course,
or else (some other daunger lying in the waie) you must
haue a thwart mark, to know both when y you are cleere
of any daunger, and also when that you are open of an
other Channell, and that you shall doe as before is decla-
red, to take some marke within the land, and also another
nere vnto the sea, water, or riuers side to be your thwart
marke when you bying them both together . And this is
most specially to bee noted : that these markes bee verie
rare,

The
height of
the Pole
at the en-
terance of
the sleue

Necessary
things to
be noted
for them
that are
Channel-
lers & de-
clers amon-
gest sands

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pare, and good when the one is farre distant from the other: and those marks very slow & at keth some distance in sailing to open and shut them which are nere together vpon the lande. And furthermore, for them that are Channellers or occupiers amongst landes, for that the weather is not alwayes clere, when they haue occasion to passe through such places, it is good for them to sound the channels perfectly, and to knowe by the depth, what side of the channell they are vpon, and also how far they are shot into that channell. And also in lyke manner, to knowe by the sounding of any of the sides of the channell, whether they be nere any of the sands or daungers, or any breach off: for that some landes or daungers there be hauing faire or good soundings or shaldings, that they may borrowe off and on at theyr pleasure. There be againe some sands or daungers, that ther is no borrowing nor sounding of them, and those be neall or deepe harde vnto the sands or daungers: for that the water is deepe hart vnto the sand: and these are verie dangerous sands for any ship to come nere, for that they shall haue the water verie deepe, and by and by be a ground. Yet furthermore, it is very good for them that be channellers and occupiers amongst landes, to knowe which waye the tide doth set at euerie time of the tide: for that many times it happeneth so, that when the sands be vnder the water, the tide doth set crosse the channell, which is a dangerous matter if it be not verie well considered by the Master or Pilot, &c.

¶ The 23. Chapter is as touching the variation of the compassse, called the Northeasting and the Northwesting of the Compassse: and how to giue a gesse to knowe the Longitude.



So touching the variation of the Compasse called y^e Northeasting or Northwesting, it is supposed that the Compasse doth vary by proportion, in the sayling to y^e Eastwards or Westwards: if it varieth by proportion, that the North poyn^t is varied one poyn^t from the North, at 22. degrees and a halfe, and so vntill the North poyn^t doth stand Northeast or Northwest. And that is, when you are 90. degrees from the Meridian that the compasse was made at, to y^e Eastwards or Westwards: Some also are of another opinion, that the Compasse doth varie by no proportion, but doth varie according vnto the nature of some kinde of Mineralls, that is in some Countrey, or some kinde of Ilands, that drawe the Compasse by the mynes of the Loadstone, or Magnes stone that they touch their Compasse with, when they make them. And furthermore, the Booke of Martin Curtise (called the Arte of Nauigation saith) that the Compasse doth varie by proportion in this manner: which is by the proportion of a Circle, for that the North poyn^t doth alwayes point vnto a place in the heauens that is vnmoueable, and therefore as you do transport your selfe to the Eastward or Westward, the North poyn^t doth still point vnto that place in the heauen: wherefore (as he saith) when you be 90. degrees in longitude frō the place y^e the compasse doth stand due South & North, that is, when you be one quarter of the Circumference of the earth, in that Paralell the Compasse will be varied 4. points from the North: & as you do transport your selfe further, then the North poyn^t of the Compasse will come nearer & nearer vnto the north: and when you are iust halfe the circumference of the earth, that then the North poyn^t will stand due North vpon the Pole againe, for that you are come to the same

Of y^e compasse to vary to euē proportion

Of y^e compasse to vary by no proportion

Of y^e compasse to vary according vnto the proportion of a circle that is, swiftly & slowly.

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Meridian again vpon y^e opposit part of y^e earth (as it doth appeare in the 3. part & 5. cha. of the said booke of Martin Curtise) but if that be true, then the compasse doth varie swiftly at the first, and slowly afterwards, in order lyke vnto the sunnes declination: by which (if it be true) they maye very well knowe what order the compasse doth varie by, and so by the variation you may giue a nere estimation of the longitude, and know in how many degrees the compasse is varied 1. point. 2. points. 3. points, & so the greatest variation, which is 4. pointes. Nowe to know the proportion, do this: First make a circle with a paire of compasses, and strike a line by the center to the circumference, which shall be your Meridian lyne, then strike another line by the center a crosse, y^e you maye deuide the circle into 4. equal parts, & then for y^e 45. degrees is the greatest variation, set 45. vnto the East part and west part, deuiding euery one of the quarters of the circle, into 45. equall parts, according to the greatest variation: then make another circle of that Diameter, that the circumference touch that center of the circle, and deuide it as you deuide the compasse, after the rate of 32. points, although you neede not deuide but that side to the Northwards, & then the North-east & North-west point will fall vpon 45. degrees: that done, drawe lynes according to the points of the Compasse vnto the Eastwards or Westwards, and looke how they fall vpon the lyne that commeth from the center of the other Circle: of which euery quarter is deuided into 45. equal parts, & then (at the very place that the line doth touch) drawe paralell lines in y^e circle by proportion at the very place to the Eastwards or Westwards, y^e the lyne of the compasse falleth vpon: & that wil shew you iustly how many degrees you shal transport your selfe vnto y^e Eastwards or Westwards for the varying of the first point, seconde point, and thirp point: and in like manner the greatest variation.

To know
in how
many de-
grees go-
ing vnto
the East-
ward or
westward
that the
compasse
doth vary
1. Point
2. Points
or three
Points,
&c.

Variation which is the fourth poynt. So that (according to that order) it will fall out in this manner, that the Compasse will be varied one point at nere eleuen and
 1. It will be varied two points nere about 24. degrees
 3. and a halfe.

To know
 how many
 degr.
 is in the
 varying
 of one
 Point.

It will be varied three points at fortie two degrees and about a halfe. But it will not be varied the fourth poynt untill you be foure score and tenne degrees from the Meridian that the Compasse was made at: which is a very slow varying being 47. degrees and $\frac{1}{2}$. before

the Compasse doth vary one Poynt, and betwene the third Poynt and the second Point, being 18. degrees for the varying of that Point, and then from the seconde poynt unto the first poynt is 13. degrees and better and last of all from the varying of one Poynt to the Meridian it is 11. degrees and $\frac{1}{3}$. part, euery degree being ac-

ording to the Paralell you are in, which doth alter according unto your latitude from the Equinotiall: for vnder the Equinotiall it is 60. English miles or 20. English leagues unto one degree. In the latitude of 60. degrees from the Equinotiall, there in that Paralell it is but 30. miles or 10. English leagues unto one Degree, &c. As it is plainly shewed in the 16. Chapter of this booke, wherein is an instrument shewing you how many miles of longitude will aunswere unto a degree in euery seuerall Latitude by the replying of a threde at your discreation: So that I conclude, if the Compasse doeth varie, by that order of proportion that Martine Curtise doeth attribute unto it, you maye giue a nere gesse to finde the Longitude by the varying of the Compasse being nere unto the Meridian that the Compasse doth stand due South and North. But if you be very farre from the Meridian & the com-

If you
 will know
 how many
 leagues
 a degree
 is
 repaire
 to the 16.
 Chapter.

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passed was made for, then the variation is so close, that you can haue no iudgement at all (by the variation of the compasse) to finde any Longitude.

There may
growe
some er-
ror in the
proportiō
of the va-
rying of y
compasse

And furthermore, if the compasse doth varie by that proportion that Martin Curtise doth affirme, I am of that opinion, that there may growe some error in proportion in those compasses that are made for any Meridian: for those compasses that are made here with us in England, whereof the needle doth stand 4. or 5. Degrees vnto the Eastwardes of the North, (as doth appears by all the needles made for Dials, and also in the compasses) if they would haue the North point to stand due North, then the ende of the wiers vnder the card of the compasse should stand foure or fife degrees vnto the Eastwardes of the Flouredeluce: wherefore it may be doubted, that the compasse maye varie more the one way than it will the other way, by that proportion that the ende of the wier doth stand beside from the North point. For (if in the greatest variation) the ende of the wier (vnder the card of the compasse) doth stand north-west, the Flouredeluce of the compasse shoulde stande neere halfe a point to the westwardes of the North-west. And in like manner at the greatest variation, if the ende of the wier doth stande North-east, then the Flouredeluce should stand neere halfe a point vnto the Northwardes of the North-east, &c. Wherefore the Compasses that is deuised by Norman, is very good to reforme those causes. But this cause is very speciall, to giue a neere gette of the longitude, that is to saye, the compasse will varie more quickely (according to the order before written) by which you see they maye transport themselves further into the Eastwardes or Westwardes, before that the compass doth vary one point, than it doth for the other three points, so that they are not able to giue any estimation at all, by the varying of the compasse,

Of slowe
varying

pasſe to know any longitude: ſo; that they may trauaile of the
more then the quarter of the circumference of the earth, compaſſe
before the compaſſe will be varied one point backwards
and forwards.

And furthermore, it is verie good ſo; them that are
maſters or Pilots of ſhippes, to note, when they doe fall Of mak-
with any land where the Compaſſe is varied, to make a ing notes
remembrance in a booke, how many pointes and degrees of the va-
the compaſſe is varied in euerie place where they come riation.
vnto, which will be a great helpe ſo; them to finde that
place againe. And to finde the variation, it is declared in
the firſt chapter.

¶ A Hydrographicall diſcourſe to ſhew the paſſage vnto
Cattay ſiue manner of waies, two of them knowen, &
the other three ſuppoſed, wherein you ſhall know the
diſtaunce vnto Cattay; and alſo by what pointes or
winds of the compaſſe that you ſhall ſaile for the attai-
ning thether, and alſo the reſt of the Eaſt Indies.



Whereas it hath bene oftentimes in que-
ſtion of late yeres nowe in this our age,
ſo; the diſconerie ſo; to finde out a waye
to come vnto Cattay, China, and the I-
lands of Moluccas: with other places in the
Eaſt Indies. I haue thought it good to
write this Hydrographicall diſcourſe, to goe vnto Cattay
ſiue manner of waies, ſo; that there is ſome people that
are doubtfull whether that there is any ſuch place, other
ſome is doubtfull that there is no paſſage thether.

So ſome holding one opinion and ſome another, I
haue taken vpon me ſo; to ſhew vnto them the paſſage to
go vnto Cattay ſiue manner of wayes, whereof two of
them are knowen, and the other three ſuppoſed.

Wherein I haue ſet downe perticularly the courſes,
S. ii. that

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that is to saie, by what point of the Compasse that you must saile, and also the distance what number of leagues that it is from place to place, I hauing perused the best Colimographers, & for that we haue no Charts or Plats Hydographically that doth shew the true courses and distance, it is possible that is not exactly true, but onely to glaunce somewhat nere the matter: Therefore you must not looke to haue it so certaine that there is no error in it, neither I am assured that it is not altogether vnttrue, neither in the distance nor courses, but that you may haue some aide by this, &c.

And first this, for to goe vnto Cattay that waite that the Portugalls doth goe vnto Ca'icut and the Ilands of Moluccas, which is about by Cape bone sperance, & now for to procede to goe that way, and first this, for to depart from the Lizard or Cape of Cornewall, being the Westerne part of England, and for to make your direction from thence vnto the Canarie Ilandes, hauing latitude twentie eight and a halfe, the course is nere the South Southwest about five hundred leagues.

And of the Starbord side is the West Ocean sea, and on the Larbord side, first the coast of Fraunce, and then the coast of Spaine and Portugall, and then the coast of Barbarie in Africa, &c.

And from the Canarie Ilands vnto Cape de varde, in Ginney, the Latitude thereof is nere 15. Degrees, and the course is South about 270. leagues, and on the Starborde side is the West Ocean Sea, and on the Larbord side the Coast of Barbarie and Ginnie, and from Cape de Varde vnto Cape Palmas, the Latitude is nere 4. degrees, and the course is South and by East, about 230. leagues, and on the Starborde side is the Ocean Sea, and the larbord side, the coast of Ginnie. And from thence for to make your direction with Cape bone Sperance, being the Southermost parte of all Aethiopia, for
saking

taking the Coast, and to make your course thoroꝝ the Sea, the course is néere the Southeast and by South, 1060. leagues, and the Altitude is the Antartike Pole, about 35. Degrées above the Horizon, and on the Starboꝝde side is Brasile in America, and the great Riuer of Platte, and on the larboꝝde side is the coast of Castel de Mine in Ginnie and Binney, and the coast of Aethiopia, &c. But if that you will keepe the coast of Ginnie, then foꝝ to depart from Cape Palmas, foꝝ to goe vnto the Iland of Saint Thomas, then your course is East and by South, néere 560. leagues, and the Iland of Saint Thomas hath no Latitude, foꝝ that it is directly vnder the Equinoctiall, and on the Starboꝝde side is the Deceant Sea, and on the Larboꝝde side the Coast of Castel de Mine, and the coast of Binnie, &c. And from the Ilande of Saint Thomas, vnto Cape bone Sperance, the course is South and by East, about 750. leagues, and on the Starboꝝde side is the Deceant Sea, and on the larboꝝde side the coast of Aethiopia: and now from Cape bone Sperance, vnto y^e great Ilande of Saint Laurence, the Westermost parte of the Ilande, and that hath Latitude towarde the Antartike Pole, about 28. Degrées, and the course is from Cape bone Sperance, Northeast and by East, about 550. leagues, and on the Starboꝝde side, is the vnknown land that lyeth towards the Antartike Pole, and the larboꝝde side the coast of Aethiopia, and the length of the Ilande is about 360. or 400. leagues, and the longest waie of the Ilande doth lye East Northeast and West Southwest, and is from the mayne lande of Aethiopia about 80. or 100. leagues, &c. And furthermore by the waye, I doe thinke it good foꝝ to shewe the course and distaunce vnto the red sea, and also the course and distance vnto Calicut. And first this, foꝝ to set out your course foꝝ to go from the Eastermost end of the great Ilande of Saint Laurence, and that hath the Antartike Pole rayled 13. Degrées.

And

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And for to goe with the Straights of the redde Sea, the course is North and by East about 470. leagues, and the Latitude of y^e Straights, is about 10. degrees, towards the North Pole, & this Straights is greatly occupied, for that all the Spices that serueth the Turkes dominions, and also some partes of chrystendome, is brought from the Iland of Moluccas and other parts in the East Indies, as Calicut, and such lyke places, and so by shipping transported into the redde Sea, and so put on land in Aegypt, and then carried ouer a little part of the land, and then is newlye embarked, and brought downe the great Riner of Nilus, and put a land at Alexandria in Aegypt, that is a Port in the middle earth sea, & from thence it is transported by shipping vnto a number of places both in the Turkes dominions, and other places chrystened, &c.

And from the Straights vnto the hether end of the red sea in Aegypt, the course is for the most parte North west and North North west, about nere 500. leagues. And going into the red sea, the Starbord side is the coast of Arabia, & y^e Larbord side is first y^e coast of Aethiopia & Aegypt, &c.

And also if that you wyll goe from the East ende of the greate Ilande of Saint Laurence, vnto the famous merchaunt Towne called Calicut in Indie, then your course is North east and to the Eastwardes about 860. leagues, & the latitude is five degrees to the North parts, and on the Starbord side is the Ocean sea, and the larbord side is first the coast of Aethiopia, and the Straights of the red Sea, and the coast of Arabia and the Straights of the Persians sea, and the Ilands of Ormes, &c.

But if that you will holde on your course to goe vnto Cattay, then from the East ende of the great Ilande of Saint Laurence, for to goe with the great Ilande called Traprobane, your course is East North east, or East, and by North about 1100. leagues, but it is possible, that in these courses, you maye meete with a number of Ilands,

lands, for that all this East Ocean Sea is very full of great and small Ilands, and the middle of this great Ilande lieth directly vnder the Equinotiall, and the length of this Iland is nere 300. leagues, and on the Starbord side is the vnknown landes, towarde the Antarticke Pole, and on the Larbord side the straighes of the redde Sea, Arabia, the Ilands of Ormes, the Persian sea, Calicut, and the great riuer of Ganges. And now for to depart from the great Iland of Traprobane, to goe vnto the great Ilande of Gelilow, being the greatest Iland amongst all the Moluccas, the course is East about 1000. leagues, but there lyeth a number of Ilandes in the way, and on the Starbord side is the Iland of Iaua and Berno, and on the Larbord side, the greatest heap of the Moluccas Ilandes. The Ilande of Gelilow hath no latitude, for that it lyeth directly vnder the Equinotiall, and for to goe from the Iland of Gelilow, to go vnto the coast of China, the course is North and by West, about 500. leagues. The latitude of China is about 25. degrees and on the Starbord side is the South Sea, and America, and the Larbord side is the Ilandes of Moluccas: but for to goe from the great Ilande of Traprobane, the next way to China, the course is North-east and by East 1000. leagues, and then on the Starborde side, you shall haue all the Moluccas Ilandes, and the Larbord side the maine land of Asia or East India, and then from the coast of China vnto the great Baye of Quinsay in Cattay, the course is North and by East about 100. leagues, and the entraunce of the Baye of Quinsay, the latitude is 35. degrees, and on the Starbord side is the firme land of America, and the great Iland of Iupan, and the Larborde side the coast of China and Cattay, &c.

Now thus much haue I said as touching the waye to come out of England to goe vnto Cattay, and East India, hoping that the reasonable Reader will not enuie

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me; for this vsing my discourse, neither you must not looke so erquistely vnto it, for that it cannot be the exact truth: for as I do suppose that no English man hath seene any true Charte or Plat at all the East India, where-foze I do suppose that you will beare with this my discourse, &c.

And now furthermore as touching this discourse for to come out of England to goe vnto Cattay, the seconde way, & that is knowen that the Sea wil let them haue passage, that is to say, through the straights of Magalenos, & so into the South Sea, as this, first to make their direction from the west part of England vnto y^e straights of Magalenos, although that in deed ther can be no long passage by Sea, but that the ships are to seeke some places for to water at, and other easementes, yet notwithstanding I do meane to make but one direction or course from England vnto the straights of Magalenos, for that the Masters or the Pilots may seeke their watring places most best for their purposes, &c. And first, from y^e Lizard vnto the straights of Magalenos, the course is for the most part South South-west & to the Westwards, about 2400. leagues, and the latitude of the straghts is 52. degrees and a halfe towards the Antartick Pole, and on the starbord side is the firme land of America, & the Larbord side Europe and Africa, &c.

And through the straights, the course may be West or West South-west 100. or 140. leagues befoze that they be clere in the South Sea, and now being into that Sea, they may goe either vnto Cattay or the Moluccas, or the Port of Pannama, that is the place, that the king of Spaine hath all the treasure that cometh from Perro. And from thence it is carried vp a certain riuer, and then transported ouer the necke of a land, and then imbarcked and brought down an other riuer, and so landed at Nombor the Deas, and from thence transported by ships

ships into Spaine, &c.

And now they being through the Straighes of Magalenos, if that you will goe vnto the port of Pannama, then their course is for to goe Norwest, or West and by Noe, or Noe and by West, as the lande will giue them passage, for that there hath not bene made any true Plats for that Coast in that Sea, and doth containe in leagues from the Straights vnto the Porte of Pannama, 1100. or 1200. leagues. But if that you will goe from the Straights vnto Cattay, as it is a Sea that is not vnto the South parts nere the Straights not wel knowen, so there may lye manye Ilandes in that Sea that you may meeete with, and also there may be Rockes and daungers there in like manner that are not knowen, but the general course is West vnto Cattay or China, about 2800. leagues, hauing on the Starboorde side the maine lande of America, and on the Larboorde side the vnknown land that lyeth towarde the Antarticke Pole, and also the Ilandes of Moluccas and Calicut: and thus much haue I saide as touching the Passage vnto Cattay, by these two wayes that are knowen. But here is one thing to be noted, for as it hath ben reported, that when that the Portugalls Carrickes both goe vnto Calicut, that when that they bee at Cape bone sperance, then they do not directly set their course the next waye, but standeth South ouer towarde the lande that lyeth to the Antarticke Pole-wardes, and the cause thereof, is by the meanes of the great Current, that is at Cape bone sperance, continually running from the East into the West, and then when that they haue gone 100. or 150. Leagues vnto the Southwardes of the Cape, then they set their Course for to goe with Calicut, so that outwards that they do not come nere the great Ilande of Saint Laurence, but goe a great deale to the Southward of it, for that they will not be let by the great cur-

rant:

L.ii.

rant:

The regiment for the Sea.

rant: But when that they doe come homewards, then they doe come hard by the Ile of Saint Laurence, and so directly with Cape bone sperance, so that they wil haue all the helpe that they may with the Current, then they goe West North west into the Sea with the maine lande of America, till that they be half that Sea ouer, and then they doe set their course to goe homewards, as it is not vnknown, that when the Spanish Flēte doth goe vnto the West Indies, that when they goe outwarde, that they doe goe into the Canaries, and so West into the sea, and so holding in the South land of the Baye of Mexico, so that they haue some helpe by the Current: but when that they do come home, then they do come by the North land of the Baye of Mexico, betwene the Island of Cuba and Terra Florida, so that they will haue the Current homewards to helpe them. Also it is reported that in the Straights of Magalenos, that the Current runneth continually from the East into the west. Now this much haue I said, as touching the two waies vnto Cattay, so that it is known that there is passage by Sea, if that it were attempted, although the passage is very long, &c.

And now furthemoze, so to discourse the third waye, that is not known, but supposed that it may be passageable, that is by the North west, as now of late Captayne Forbisher hath begun, and hath discovered as farre as a place nowe called Meta Incognita, which hee himselfe did call Forbishers Straights, but yet notwithstanding it is doubtfull, whether that be a Straights to giue passage to come into the East Ocean Sea, or South Sea, so anye thing that is known yet, it maye be as well a Baye as otherwise, but notwithstanding whether that be a Straight or not, it is possible that there maye be passage there about, betwene the Norther parte of America, as betwene Labradore and Groyland, and such

such landes as lyeth vnto the North Pole-wardes.
 Therefore now to goe to depart from England to goe vnto
 Cattay by the North-west, first this to make their
 direction from the West part of England, vnto the place
 called Meta Incognita, the course is West North-west a-
 bout 650. leagues, and the latitude thereof 63. Degrees,
 and on the Starboard side is first Ireland and Iceland, and
 Freeland, and on the Larboard side, is the Decean Sea.
 And now being at Meta Incognita, they must discover
 thereabouts, where that they may finde Sea for to giue
 them passage, & yet if they do finde sea, they must hold on
 their course West vntil y they haue passed 1000. or 1100
 leagues. For if that they should hold on any Southerly
 course, then they should imbaye themselves in the maine
 land of America; for the extension of the backe side, or
 North side of America, is not much lesse then 1000. lea-
 gues, before that they shal open y way into the East De-
 cean Sea, and in this West course on the Starboard side
 is the North Pole, and such landes as lyeth that way if
 there be any, and on the Larboard side, is the maine of A-
 merica;

And after that they haue sailed West 1000. leagues
 on the North part of America, they maye then direct a
 more Southerly course, for that then they may be open of
 the East Decean Sea, for that the most parte of the best
 Cosmographers laye the opening of that Sea opposite
 vnto vs in our Meridian, & then holding on a Southerly
 course, then they may haue vnto the great bay of Quinsay
 about 400. or 500. leagues. And the latitude of y North
 part of y Bay of Quinsay in Cattay is about 46. degrees,
 and on the Starboard side is the coast of Asia, as Mangie
 and Cattay, and on the Larboard side America. And thus
 much haue I sayde as touching the third way to goe to
 Cattay, &c.

And now in like manner as touching the fourth waye

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to go vnto Cattay not knowne but supposed, and that is by the North-east part or North part of Russey, about by that waie that Master Barrowes began the discoverie, about by a lãd that is called Noua Zembla, which is a countrey or point of a lãd that extendeth to the Northwards, it is not knowne how farre, and yet it may be possible that it is navigable that wayes if it were attempted.

And now for to passe that waie vnto Cattay I will a litle vse my discourse. The waie and distaunce vnto the North Cape in Norwaie is not vnknewen vnto a number of Sea men, the Latitude thereof is 71. Degrees. 20. minutes, therefore I doe thinke it best to beginne the direction and setting out the course East, vntill that they doe come wth the lande of Noua Zembla, and then falling wth that place to make theyr discoverie as the lande wyll geue them leaue, and so in this direction it maye be possible that they maye finde a Sea to giue them passage as it maye be possible, that when they maye meete wth lande, that they shall be constrained to goe North-east or North Nor-east, vntill that the North Pole bee raised eightie or eightie fve Degrees, yet they maye holde on theyr course vntill such time that they shall bee incombred wth Ise, for it maye bee so, that in the Latitude of 80. Degrees, there shall bee no Ise, although that on the Coast of Baculayas, you maye haue Ise in the Latitude of 50. Degrees, for no man can tell vnto such time as it hath bene put in experience, and nowe in this passage vnto the Eastwardes from the North Cape vntill that they shall haue the sea open to come into the Southwards in the sea of Cattay, it maye bee about 1000. or 1200. leagues, and then in this passage on the Starbord side is first Norway and Lapia, and the Baye of Saint Nicholas, and the greater riuer of Obe and Noua Zembla, and the East parte of Asia, and on the Harbord side the North Pole, and those
landes

landes that lie that waies if there be any, and now in the following of the coast of the lande which may be South-east or South Southeast or South, it maye be 500. or 600. leagues vnto the Bay of Quinsay in Cattay, and on the Starboard side is Asia and the coast of Mangie & Cattay, & on the larboard side the maine land of America, &c.

And furthermore, it may be possible for to finde passage for to go to Cattay, betwene Noua Zembla, and the countrie of Samowetes, through the sea of Vagates, & this passage may be somewhat shorter, then for to go vnto the Northwards of Noua Zembla, & then you shall haue in this passage vpon the Starboard side, first the countrie of Samowetes, as Pichora & the riuer of Obe and Tartaria, &c. And on the Larboard side, Noua Zembla, &c.

And this I doe end as touching the Northeast passage to goe or attaine vnto Cattay the fourth waie, &c.

And furthermore as touching the fifth waie to goe vnto Cattay, it is possible that in my discourse it is mere follynesse and a thing impossible for it to be done, and yet notwithstanding no man can tell, before that it is put in experience, and yet it is the nearest waie if that it be nauigable, and my meaning is this, for to goe directly vnto the Pole, if so be that there is no land to let the passage. Now it is possible that some will say that it is the frozen Zone, but notwithstanding if that there is not lande that waye, then it is not frozen, for the greate salt Sea neuer freezeth, and for that you doe see the greate quanttie of Ice on the Coast of Labradorre and Baculayas, it is a token that there aboutes is much lande towards the North Pole wardes, and so is frozen in Sondes and Riuers, and so in the breaking up of the yeare, that then it doth come swimming out to Sea: for in respect they doe seldome see anye Ice at the North Cape, nor 100. leagues North off from thence, which is a great token that there is no land towards the Pole.

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Pole-wards, and before that it hath bene put in proue it cannot be knowen. But all the doubts for going vnto the Pole-wards, is for feare of too much colde, & yet notwithstanding it maye be reasonable warme right vnder the Pole for any thing that is knowen vnto the contrarie, by the long continuance of the Sunne in Summer, for that in the time of 9. weekes, that the Sun is neuer lesse then 20. degrees aboue the Horizon going round about them, so that the continuance of the Sun must inforce the aire to be reasonable warme, & especially if that ther is no Isle dwelling in y^e sea, for it is not so cold at Meta Incognita, if that they be not amongst the Isle, for if that they be at sea and not amongst Isle, then it is verie warme, and also if that they be a shore, then it is warme in like manner, so that the cold is by no other meanes but the cold breath or aire that commeth from the Isle. And now for to procede to go vnto Cattay, and to go directly North till that they be right vnder the Pole, and then to goe South to the opposite part beyond the Pole, which is to be done if y^e they be not let by any land that lyeth in the way, then it may be possible for it to be done, and then the whole distance in this course from the riuer of Thames vnto the Bay of Quinlay is but 1680. leagues: which is a verie short way in respect of the other. But now it is possible that some will make agrument and say, that it is not possible for any man to make any directio or set any course being directly vnder the Pole, for y^e it is not knowen which way that the compasse will stand, and also in like manner being vnder y^e Pole, all places is South which way so euer you go, & also the Sun is equally one height, so y^e you can make no proue which way is forwarde, & which way is backwards, therefore it is to be supposed, that some will say, that it is not possible to make any instruments to assigne any course to any place appointed, for truth it is being vnder the Pole that any place assigned is South from them

them that is vnder the Pole, what quarter of the world
 Toeuer that it is in, and if that the Sea will giue them
 passage, their course is South to goe vnto it, &c. Yet
 notwithstanding I will shew vnto you what you shall
 doe to make a perfect direction vnto any place appointed
 you being right vnder the Pole, that you shall knowe
 whether that you doe goe backwards or forwards or a-
 ny other way that you shall appoint, so that you may see
 the Sunne, and that must be done, as this. First prepare
 a perfect good clocke that goeth with a Spring and to be
 made in that order that the directer or pointer dooth goe
 round in 24. houres, and so to be marked for to ende 24.
 houres at none, and then to begin one, and this clocke or
 Diall being well made and dooth keepe the time trulye,
 then when that you doe approach nere the Pole within
 100. leagues, that is at the latitude of 85. degrees, and so
 farre the Compasse may serue, and also you may correct
 the Compasse well inough, for that the Sunne is 10. de-
 grees higher on the South parte, than it is on the North
 part, and now going within 5. degrees of the Pole, set
 your clocke to worke, and 24. houres to be none, and
 then when that you are directly vnder the Pole, loke if
 that the Pointer dooth stand vpon 24. houres, then that
 part or quarter that the Sun is in, is right back againe,
 and if it point 12. houres, then towards the Sun-wards
 is right forwards, and if that it point 6. houres, then to-
 wards the Sun-wards dooth shewe, that if any place bee
 west from the place that you did come from, and is one
 quarter of the earth, that direction wil set you right vpon
 it, & if 18. houres, then towards the Sunnie dooth appoint
 you that place that is East one quarter of the earth, &c.

And now for to set any course to stirre the ship vpon
 any place appointed, then note this as for an en-
 sample, I would goe directly homewardes, and then I
 will set the He of a Compasse before him that shal stir

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and then for that I come out North and I must go home South and lay the Card or Flye stodie before me, & the South point right with the ships head or stem, and so I do set the clocke by it, now if that the clocke doth poynt 24. houres for that afore was my none, then I do stirre the ship right vpon the Sunne, and if the clocke doth ap-
poynt 3. houres, then he that doth stirre must keepe the Sunne vpon the Southwell, and so that the ship go that South that she came from, and if that the clocke doth poynt 6. houres, then he that doth stirre, must keepe the Sunne vpon the west point, and if the clocke shew 9. then keepe the Sunne vpon the Northwest. If the clocke doth shew 12. then the Sun must be on γ North poynt, that is right with the Starne of the ship. And if the clock doth shew 15. houres, then he that stirreth must keepe the Sunne vpon the Northeast point, if 18. then the Sunne on the East point, and if 21. houres, then on the Southeast point, &c. But now if γ you would go directly forwards, then lay the North point right with the ships head, and when the Clocke doth point 12. then stirre right vpon the Sunne, and so in like manner to stirre by the Sunne as I haue afore shewed you by ensamples, so that you may see by this clocke or diall, you may assigne your selfe to keepe any course into any place in the whole world, you being vnder the Pole, and then when that you are departed from the pole 100. leagues, that is 5. degrees, then you may vse your Compasse, and correct it by the Sunne at your plesure. And thus much I haue said as touching the passages to goe vnto Cattay, wherefore gentle Reader beare with my rudenesse, for that I am so bold to vse my discourse vpon the passage vnto Cattay. And furthermore, some men hath ben of that opinion, that when that they are in the East Ocean sea that they shall meete with no shipping, as about Cattay and China, &c. But notwithstanding it is a sea that there is a huge number
of

of ships both great and small, for this must be most certaine that whereas there is such great trade of Marchandise, and also such a number of Islands both great and small, and also such a number of commodities in those Islands, so that any man may iudge that there is greatesore of ships, and also ordinance in their shipping, &c. And it is not vnknownen but that the great Cane of Cattay, is a Prince of great power as well by Sea as by Lande, then iudge you whether that such a prince of such a force and welth but that they wil prouide for all things meete for warres. Therefore as soone as they come into those coasts they must orderly vse the trade of Marchandise, & not to vse force, &c. As vpon a time I being with Master Dee at his house at Murclacke, we falling in talk about the discoverie to Cattay & so talked as touching the shipping, wherebpon he opened a Booke and shewed me a note what number of ships that the great Cane had ready at one time to goe vnto Sea about his affaires, surely you would thinke it vncredible, the number was 15000. surely a huge armie by Sea: and then I replied againe that it might be that they were but smal things, and yet they might call them shippes, and then he turned vnto another place where the great Cane did send one of his daughters by Sea, and did appoint 14. of his ships, and the least of the 14. shippes had 250. Mariners, beside all the rest of his daughters traine, and such

Nobles as did accompanie hir, which must bee

no small number. Therefore it is most

manifest that the Cane is a great

Prince of power as wel

by Sea, as by

Land.

FINIS.

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